

# THE IRON AGE

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## Equipping and Managing a Factory Lunch Room

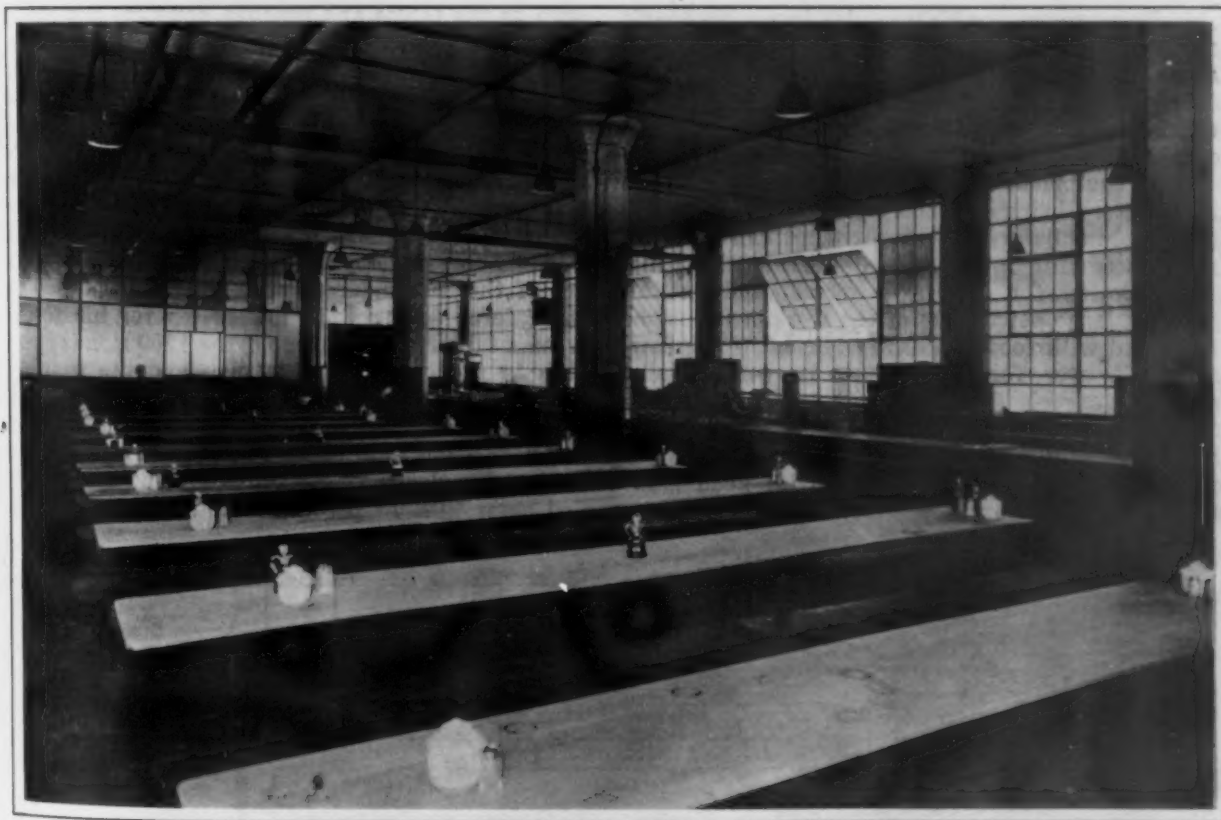
The Arrangement and Cost of Providing  
Food and Eating Quarters for Employees—  
Engaging a Caterer to Have Direct Charge

BY HARRY C. SPILLMAN

The large industrial expansions and increased land values which have occurred in the last decade have forced manufacturers to leave the congested districts and locate near the outskirts of the cities and towns. This change brings forth new problems and one of these is the feeding of the workmen in the noon hour, now that indiscriminate eating about a factory is recognized as poor practice. The progressive manufacturers of to-day have large mod-

influence the physical efficiency of the workmen and have a direct bearing on the production of a plant.

The question arises, should the employer go further than this and furnish the workmen with baths, gymnasium, libraries and other amusements? No doubt the reader will agree that these last items are entirely out of place as they represent philanthropic motives and have very little bearing upon



Employees' Lunch Room, Continental Motor Mfg. Company, Detroit

ern factories with plenty of light and splendid ventilation. The buildings are well warmed during the winter months and are equipped with sanitary conveniences, lockers for clothes, individual washbowls, safeguarded machinery and other conveniences. This industrial betterment is of recent origin and is no longer based upon philanthropic motives but on good sound economic principles, as these items

the workmen's efficiency. The average workman takes very little interest in these and a few months after their introduction in a plant they are used by a very few. Most workmen prefer to receive cash for their wages instead of receiving part in cash and part in philanthropy. They would rather choose their amusements and luxuries for themselves.



The Lunch Room in Use

However, the physical efficiency of a workman depends to a large extent upon good wholesome food. During the last few years a large number of manufacturers have installed dining rooms in their plants for their employees. When a workman depends upon the neighborhood saloon and questionable dining rooms for his noon day lunch, his hourly output begins to lag during the last two working hours. Time study has proved this assertion. The factory dining room also has a moral environment which is worth considering, as the three qualities of labor efficiency are physical, mental and moral.

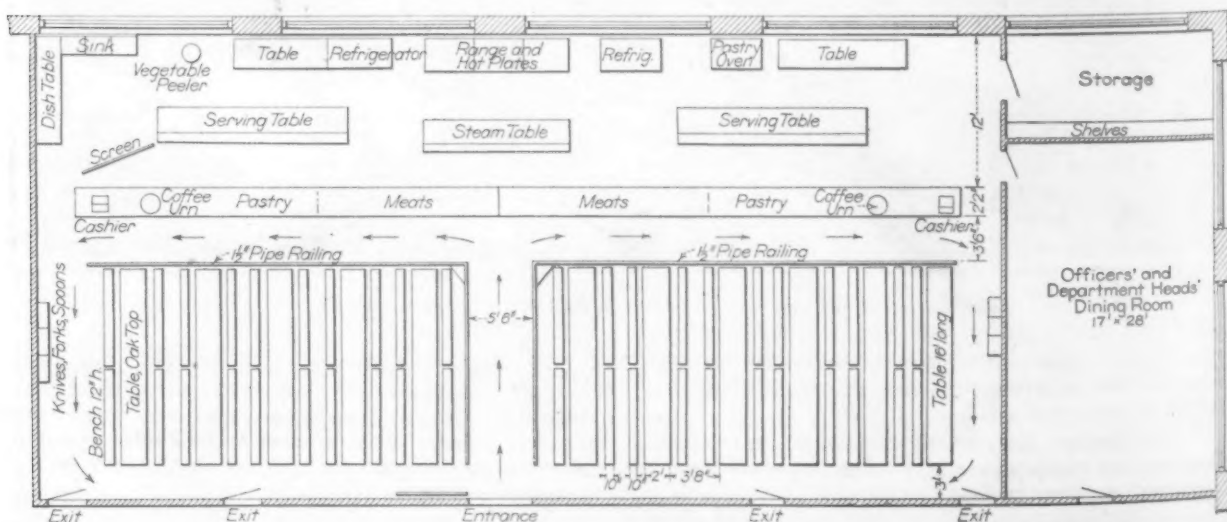
The equipment and operation of a dining room in a factory brings up many problems which have to be solved before this department can be operated successfully. Thirty minutes is the usual time allotted for the noon recess, and in this period a large percentage of the workmen must be furnished with food and have sufficient time allowance left over for eating. A serve-self dining room solves this difficulty, as this scheme eliminates unnecessary delay in placing the food in the hands of the ultimate consumer. With the proper equipment and layout, combined with good management, 200 workmen can be waited upon each

minute from a single counter.

The most perplexing problem of all is the management of this department, and the method outlined in this article works out very successfully; in fact, it surpasses the methods usually adopted for operating factory dining rooms. The entire management should be turned over to a competent caterer, who has all the qualifications and training necessary to manage the dining room in an efficient and economical manner. To induce the workmen to patronize the dining room he should serve good wholesome food on a par with the food furnished in the best class of dining rooms. It must be sold at a rate only slightly in advance of its actual cost. Every particle of food should be prepared in the plant. Pastry cooks should be employed rather than to try to introduce machine made pies

and cakes from any outside bake shop. The entire equipment should be kept scrupulously clean and the food served in a neat and sanitary manner.

In order that the caterer can keep the price of his food down to a minimum, he should be furnished the necessary space equipped with all the fixtures, such as the tables and benches, counters and sinks. All equipment such as coffee urns, gas ranges, ice boxes, dishes, silver and other portable equipment should be furnished by the caterer. He should also furnish all the labor for this department. The manufacturer should furnish free gas, rent, telephone, hot and cold water, heat and light. These items do not run up into large figures; but in case the caterer is compelled to assume this expense, it will add considerably to the cost of the food. It is one of the best inducements that can be offered to the caterer to maintain low prices for his foods. A manufacturing plant employing 1200 men is operating a restaurant on this plan and the monthly expense for gas, telephone, water, heat and light for this department averages \$47 per month, which is a very small item for the satisfactory result and convenience derived. Records covering a long period show that 73 per cent. of the workmen take



Plan of the Lunch Room

advantage of this opportunity and patronize the factory dining room.

If a factory restaurant is operated under these conditions and the caterer has the ability to purchase his supplies and provisions in large quantities and avoid the many leaks and wastes which continually creep in in this line of business, he will be able to sell his food at the following prices and still make a small margin of profit.

Soup, all kinds.....	5c.
Roasts, stews, fish, oysters, including potatoes and bread and butter.....	10c. to 15c.
Sandwiches .....	5c.
All vegetables .....	5c.
Baked beans, macaroni and spaghetti.....	3c.
Coffee .....	3c.
Salads .....	3c.
Pies and puddings .....	5c.

It will be necessary to maintain these low prices and to vary the bill of fare daily in order to create appetites. A range of food from a complete dinner to a humble sandwich should be on the bill of fare to suit the individual tastes and maintain patronage. Careful records show the workman's average price for a dinner amounts to 17 cents.

The contract covering the operation of a factory dining room should contain all the items mentioned, and there should be a clause covering the prices charged for the different items of food. In case at any time the services of the caterer are not satisfactory, he should be given 30 days' notice and the caterer should be entitled to the same option. Workmen who carry their own lunches should be allowed the use of the lunch room without purchasing food from the caterer.

The accompanying drawing shows the layout of the factory dining room for the Continental Motor Mfg. Company, Detroit, planned to seat 300 men at one time. The arrangement represents the result of considerable study to take care of the workmen in the least possible time and in a satisfactory manner. The workman enters the dining room through the main entrance and before reaching the counter receives a small tray. Immediately in front of him are the hot meats and vegetables; these are placed on the counter and he can help himself and pass along to the pastry and then to the coffee and other beverages. At each end of the counter is located a cashier and an assistant; the latter announces the amount the patron is to pay. This greatly assists the cashier. The table silver is located at each end of the room, within easy reach, and the workman is at liberty to help himself to the knives, forks and spoons. This method allows the workman to obtain his food almost immediately and gives him ample time to eat. Smoking is usually allowed in the dining room and the caterer is allowed the privilege of selling cigars, tobacco and candy.

The tables are supported on cast-iron standards and have an oak top 24 in. wide. The wood is left in its natural state which allows it to be easily kept clean. The counter also has an oak top with shelves underneath. The space between the counter and the wall gives ample room for the ovens, hot plates and other kitchen equipment. There is also a private dining room for the officers and department heads.

A number of companies operating lunch rooms have changed the noon hour for the office force, having it start after the workmen are finished. This scheme allows the same dining room to answer for both the shop and office.

The cost to the manufacturer for installing a lunch room of sufficient size to seat 300 men at one time will amount to the following:

Cost of Installing the Lunch Room	
68 lin. ft. of counter.....	\$70
178 ft. table, 24 in. wide.....	210
356 ft. benches.....	45
Pipe fitting and plumbing.....	30
3 section sink made of cypress.....	25
Miscellaneous benches, etc.....	70
Total .....	\$450

The caterer's equipment will run into considerably greater figures; the following is a fair average:

Dishes and silver ware.....	\$210
Two 10-gal. coffee urns.....	62
One oven .....	140
2 hd. boilers .....	90
2 refrigerators .....	120
12 three-burner hot plates.....	40
Cooking utensils .....	180
Steam table .....	250
Vegetable peeler (motor driven).....	90
Bread cutter .....	15
Butter cutter .....	8
2 cash registers .....	80
2 dish wagons .....	50
Total .....	\$1335

Every effort should be made to make the dining room a success from the very start, and it should not be opened until everything is in readiness, as the caterer has to depend entirely upon the workmen employed in the plant for his trade. If he does not satisfy his customers from the very start it will be almost impossible to regain their confidence. Frederick Riddell is manager of the restaurant and was chosen from a list of nearly 50 caterers who asked for the management. Factory dining rooms are fast becoming a necessity and the slogan holds good "We eat together because we work together."

#### Important Decision on Trademark Renewals

WASHINGTON, D. C., March 2, 1914.—A decision of far-reaching importance to manufacturers owning trademarks has been handed down by the Supreme Court of the District of Columbia, overruling the Commissioner of Patents and establishing the principle that a trademark which has been regularly registered in the Patent Office in accordance with the routine laid down by the trademark law can be renewed by a simple process of re-registration without going through examination, publication and the other steps necessary in connection with an application for an original certificate of registration. The Commissioner of Patents had refused to renew the registration of a trademark owned by the Standard Oil Company, basing his ruling on the provision that "certificates of registration in force at the date at which this act takes effect shall remain in force for the period for which they were issued, but shall be renewable on the same conditions and for the same periods as certificates issued under the provisions of this act."

The contention of the commissioner was that the word "are" should be inserted between the words "certificates" and "issued," thus requiring for a renewal of old certificates a compliance with all the manifold requirements of the first eleven sections of the trademark law of 1905, including the question of interference with any known trademark owned or used by another, although such ownership and use may have come into existence after the government had legalized and protected the trademark of the applicant for renewal. This construction of the clause the court deems to be erroneous.

W. L. C.

The Espen-Lucas Machine Works, Philadelphia, Pa., has recently brought out a double end axle centering machine, which is designed for centering both ends of axles up to a maximum length of 8 ft. and a diameter of 7 in. The two spindles of the machine are independently driven by two 2-h.p. motors, one spindle being stationary and the other adjustable to enable axles as short as 5 ft. to be handled. The two cradles have rollers for centering the axles and clamps for holding them rigidly in position. The weight of the machine is approximately 11,000 lb.



# Building Large Gas Engine Flywheels

Details of the Construction Methods Employed for 12 85-Ton Wheels for 3600-hp. Units—Use Made of Duplicate Parts

BY J. H. B. BRYAN

While employed by an Eastern concern manufacturing large pumping and gas engines, a contract was secured to furnish 12 3600-hp. gas engines. Six of these were blowing engines and occupied a floor space of approximately 40 x 100 ft., while the remainder were power engines occupying 60 x 80 ft. The engines were built in duplicate parts, thus saving a large amount of shop erection.

The flywheels of the engines were made in eight segments, two half plate hubs with segments secured to the hubs by 24 4-in. taper bolts and at the radial joints of the rim by four shrink links and a screw dowel. The wheels were 24 ft. in diameter and weighed approximately 85 tons. The boring and facing of the hubs were separate operations

parallel feelers for adjusting the cutting tools to remove the required amount of stock to an accurate finished dimension of the segments. The faces *l* were used for guidance in machining the radial joints for the segments. The fixtures were arranged so that both the side and cross rail heads of the planing machine could be used. The first operation on the segments consisted of planing the radial joints of top surfaces of the hub end and two spots on the rim and the radial joint, the last of which are shown at *d*, Fig. 1 and *q*, Fig. 2, to facilitate the following operations. In the second operation the bolt holes were bored to two different diameters, leaving the smaller one for opposing surfaces for washers in securing the segments to the block

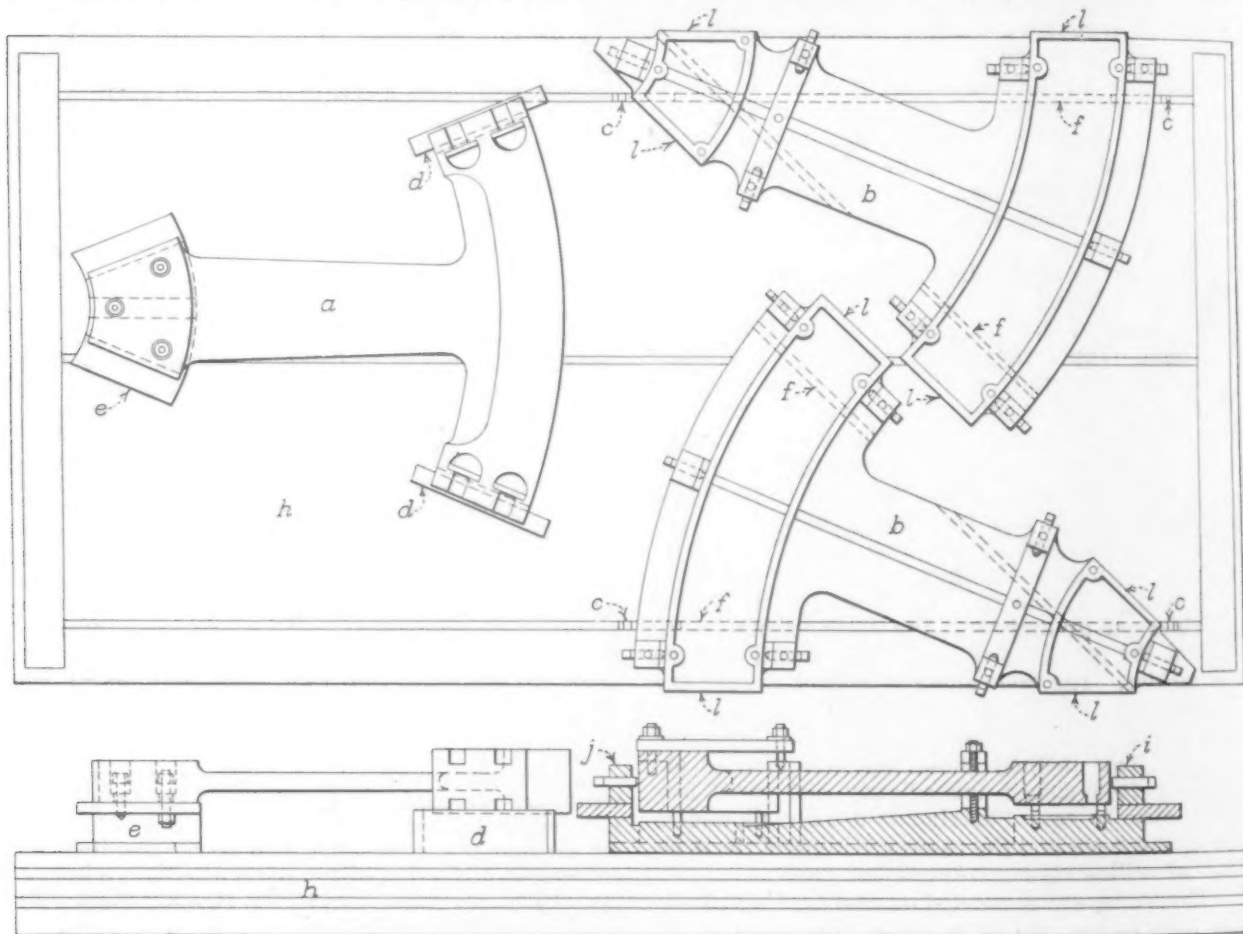


Fig. 1—The Segments of the Wheel Mounted on the Planing Machine

and the machine work was all done to gauge. For planing the segments, two fixtures *b*, Fig. 1, were provided for chucking the pieces. The faces *l* were planed to the exact angle and chord of the segment. The keyways *f* were put in the bottom of each fixture corresponding with the bolt slots in the planing machine platen *h* and doweled with four gib headed keys *c* for giving a quick and positive adjustment when the fixture with the segments was moved from one position to another as the work progressed. The posts *i* and *j* were planed to a known dimension lower than the finished top surfaces of the segments and were used as a rest for

*e*, Fig. 1. and lower hub plate, Fig. 2. A special jig having side flanges guided to position by the angles of the hub end of the segment was used in connection with the vertical boring bar for this operation. The segments were then mounted on the block *e*, Fig. 1, parallel with finished block *d*, and were ready for the final planing machine operation. The block is made to allow the hub end of segment to overhang at the sides, thus giving free access for gauging.

All the members of the flywheel are now ready to be assembled on fixtures arranged in order as shown in Fig. 2 on a concrete floor. The bottom



plate *j* and the companion plate *f* have holes corresponding in number, radius and pitch to the bolt holes in the hub and are used for bearing supports to the boring bar *g*, the plate *f* being doweled to the hub by a pin, *s*. The hole for this pin is located in the line of the keyways in the hub and when these are cut the dowel holes, of course, disappear. The stands *r* are located and pitched to the centers of the radial joints of the rim. Bearing plates are placed parallel to the finished spots on the rim *q* and the plate *j* is centered and lined to the stands *r*. Bar supporting holes in the plates *f* and *j* and the hub are brought in perpendicular alignment by shaft, having a tapered socket fit in base, which in turn has a dowel fit to a bar, supporting holes in the plate *j*. For convenience a radial drilling machine having an extended arm, *a*, mounted on a rotary base, *p*, is employed to drive the boring bar *g* and the drill for screw dowels in the rim. A standard boring bar of suitable dimensions is employed for a second roughing of the holes which are finished with the bar *g*. The construction of the wheels called for bolts having a taper of 1/16 in. per ft. and the bar had a dovetail slot, sloping 1/32 in. per ft. from the lower end of the bar. A tool block having a slot for carrying the boring tool and operated with a screw feed was fitted in this slot. Automatic screw feed using a ratchet on the driving end of the screw in the yoke *e* with a ratchet to feed the screw and when the bar *g* rotated the ratchet handle came in contact with the stationary tapped pin and a pull back spring produced the feed. The regulation of the feed was accomplished by adjusting the tapped pin giving short and long strokes of the ratchet. For quick return of the tool block, a sheave was used on driving end of the feed and was operated with a turn of a belt lacing by a see saw movement of the hands.

The performance of this boring arrangement was remarkable for accuracy and it was seldom that a reamer was employed and then only for holes having sand spots. The standard dimensions of bores for holes were obtained by tool steel trams partly encircling the bar with a contacting point for the boring tool that represents the diameter of the holes. In use these trams rested upon the hub at the terminals of the large end of the holes. After both holes were bored and the drilling and tapping of the screw dowels were completed, the drilling machine and the plate *f* were removed. The next operation was fitting the bolts *i* and in anticipation of this operation the bolts were prac-

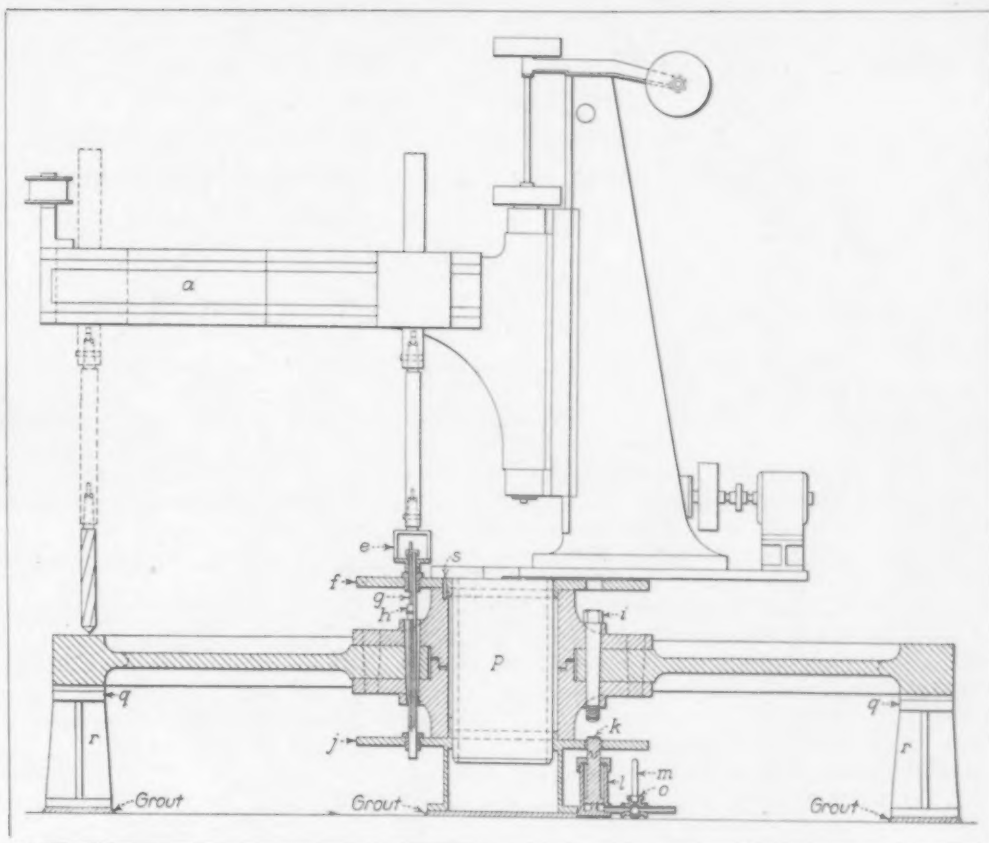


Fig. 2—The Special Arrangement of a Radial Drilling Machine for Boring the Bolt Holes in the Segments

tically completed and fitted to collar gauges, leaving a small amount of stock for the final fitting. An engine lathe mounted upon wheels and a conveniently located jib crane for handling the bolts were found economical stunts. The bolts were driven to within a predetermined distance from the heads with a 20-lb. sledge and were driven home with a battery ram at the final erection. In fitting the bolts in position it was found very difficult to back them out with ordinary means and for this purpose an air jack, *l*, was used having a plunger with a soft metal head, *k*. Moving the operating lever *m* of the three-way cock *o* caused the plunger to ascend and strike vigorous blows that soon loosened the bolts. This jack was also used in driving the temporary hub bolts for the turning and facing operation, which is shown in Fig. 3.

The opposing surfaces are machined to undercut dimensions. The method of machining the surfaces *m* is novel and interesting and is shown in Fig. 4. This represents a shaping machine that cuts on forward and return strokes, the wedges *a* having a taper corresponding with the undercut slope of surfaces *m*, Fig. 3. Fig. 5 is a fixture for holding the links before they are machined on a slotting machine. These links are secured to a table that is free to revolve on a dowel fit to a base having a slope corresponding with the undercut and held in place by the dowel pin *b*. The hub members of the segments are mounted on a bushing, *e*, Fig. 3, for the mandrel *j*. The segments are then assembled, the hub bolts driven and the rim secured with screw dowel bolts *f* and washers, and the wheels are now ready for the turning and facing operation. To take care of the vibration of the rims which is present in handling such a large piece of work, a steady rest was made by tooling a groove, *o*, on the outside face of the rim with a round nose tool. The hardened dummy *g* secured in the tool box of slide rest *n* was fitted in this screw, which when well

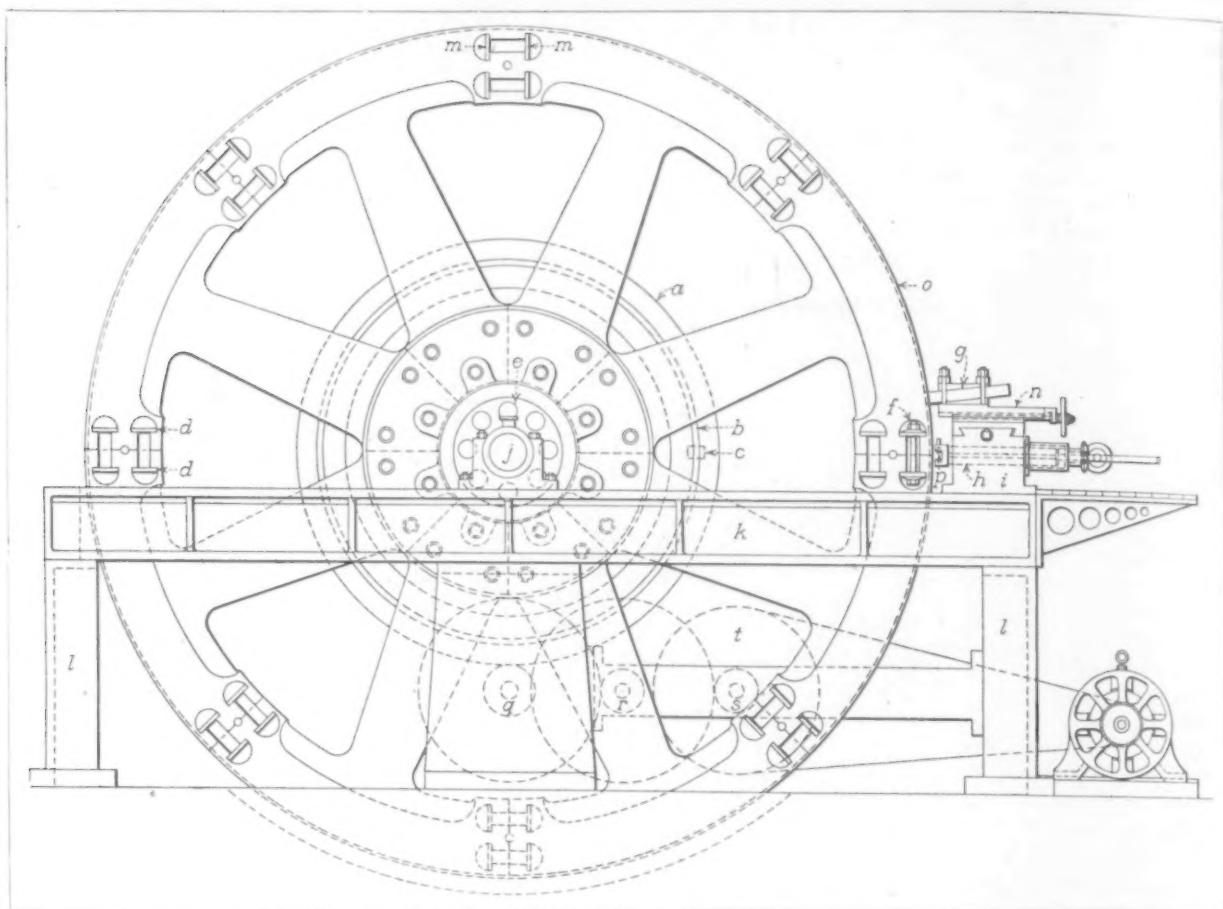


Fig. 3—Facing and Turning the Rim in a Special Machine

greased, met all the requirements of a steady rest while the two bars *h* are facing the sides of the rim. When the facing of the side was completed the tool bars with wooden rubbers in the tool slots *p* were employed to steady the rim, while the outside diameter was being turned. The flywheel machine shown in Fig. 3 was designed and built by the writer with a view of varying the beams *k* to suit the machine operations of a variety of flywheels and kindred members. The slide rest has two tool bars *h* independent of the saddle that carries the upper slide rest *n*. The tool bars are fed independently of each other. The driving mechanism consists of a large gear, *a*, centered on the mandrel *j* and having a face for bolting angle drivers near

the outer diameter with a circular bolt slot, *b*, and an enlarged opening, *c*, to admit bolts to the slot. The pinion *q* meshes with the gear *a* and the gears *r* and *s* and the driven pulley *t*, which is belted to the motor, complete the drive.

The keyways in the hub were made  $\frac{1}{8}$  in. less in width than the keyways in the shafts to take care of distortion in the keyways after the hubs were pressed on the shaft and were opened out to proper dimension by the use of drift tool placed in the key slot and guided by the keyway in the shaft. The cutter was fed by shimming and the operation made a keyway for side bearing fit of keys. The time saved in fitting the keys with the tool more than paid for the time and cost of making it.

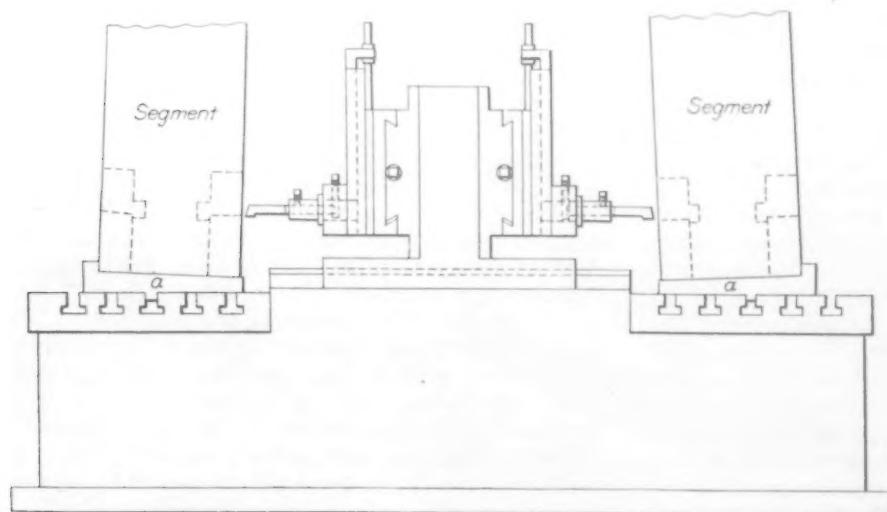


Fig. 4—Method of Mounting the Segments on a Shaping Machine

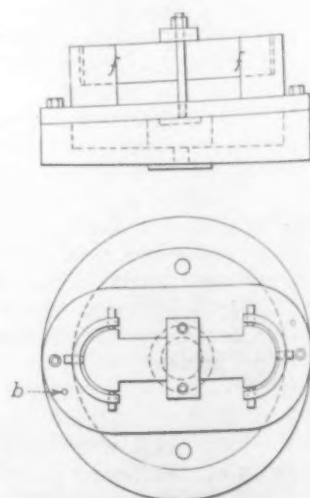


Fig. 5—Detail of the Fixture for Holding the Links in a Slotting Machine

# Argentina's Possibilities as a World Market

Trade with United States Will Increase—Good Demand for Our Structural Steel and Railroad Material—Next Port to New York

—BY CHARLES M. PEPPER—

BUENOS AIRES, ARGENTINA, February 10, 1914.—Argentina is one of the world's best markets for manufactured products, because it is one of the world's chief sources of supply for food products. The natural resources are almost entirely agricultural. The country has a large surplus and for many years will have a large surplus of wheat, corn, oats, linseed, and beef and mutton for export. Correspondingly, it will be a buyer of iron and steel products, cotton fabrics and general merchandise. The lack of mineral resources is the drawback to Argentina becoming a manufacturing country except for light manufactures. It is also doubtful whether there is the water power sufficient for the development of hydro-electric plants on an extensive scale. But the agricultural wealth compensates for the lack of basis for industrial enterprises.

Briefly put, Argentina exported in 1912 (the figures for 1913 are not yet available) wheat, maize, linseed and oats to the value of \$263,000,000 and live stock and meat products to the value of \$188,000,000. It imported goods to the amount of \$385,000,000, of which iron and steel and their manufactures comprised \$46,000,000.

## SMALL MINERAL DEVELOPMENT

The topography of the country does not indicate the probability of future mineral discoveries of importance. Rich as the basin of the River Plate is agriculturally, no indications have been discovered of coal such as lies under the prairies of Illinois and Iowa and other western States. The Sierras and foothills of the Andes may some day yield mineral wealth but there are no present signs of iron ore or copper in large quantities. Patagonia—that is, the southern region down to the Straits of Magellan—geologists say may repay scientific exploitation, for but little is yet known of it geologically, yet it is a reasonably safe pre-

diction that the sheep pastures of Patagonia are of more present and prospective value than any mineral wealth that may be uncovered.

It is true that petroleum has been found in the territory of Chubut in the district known as Rivadavia. These oil deposits are being worked in a small way under government direction and there is a proposition to nationalize them and largely extend the present facilities of production but there is still the uncertain factor as to how much oil there is really in the Chubut field. Some of the Argentine people see a great future for these oil fields and believe that a very large saving may be effected in Argentina's annual fuel bill by the substitution of native petroleum for imported coal but others are not so positive.

The coal bill undoubtedly is a large one. During 1912 the importations of coal were valued at \$26,000,000. For the first nine months of 1913 these imports exceeded 3,000,000 tons.

With the lack of iron ore and coal it will be seen how remote the prospect is for the establishment of iron and steel industries in Argentina. The expense of fuel for industrial plants, through the necessity of importing it, will also be understood. Yet there will be some industries of a domestic character. Argentina seeks to utilize a portion of its wheat production by turning the cereal into flour not only for domestic consumption but for export; and there are numerous flour mills. There are also wood working establishments, leather industries and various other minor industries. But these only emphasize the fact that the country is not a manufacturing one and always must be a large buyer of manufactured products.

## RAILROAD DEVELOPMENT

For twenty-five years Argentina has been a very good customer for manufacturers of rails and railroad material. In 1890 there were 5750 miles



Fig. 1—Buenos Aires Harbor and Docks





Fig. 2—Home of the Progressive Club, Buenos Aires

in operation. At the present time there are more than 20,000 miles. The question arises whether the construction will be continued in the future at the same rate as in the past. Possibly not, but it will go on at a good rate for many years to come, for there are new sections which want transportation facilities and sections already provided with them which need additional lines. Periods of depression such as now exist may halt railroad building temporarily, but with a series of good crops and good prices in the world's markets the construction of new lines is again taken up. It may be that for the next two years, or until the financial situation improves, Argentina will not do much railroad building, yet the mere maintenance of existing lines assures pretty steady purchases of material.

In the past the policy of the federal government has been to build state lines where private enterprise, even with government aid, could not be relied on to provide the facilities which were required by the national development. The nation got beyond that stage some years ago; but the various provinces followed the same course, sometimes wisely, sometimes improvidently. Just now the province of Buenos Aires, dissatisfied with the plans for extensions by one of the great railroad companies, is seeking a loan with which to build its own lines. The condition of the world's money markets does not offer much encouragement to the project, but between the determination of the province to have more railroads and the desire of the existing companies to maintain their position by extending their lines, further railroad construction will come in time.

The Argentine railroads, as is well known, are chiefly owned in England, but the French have some profitable investments in several of the provinces, and international syndicates are concerned with the extension of the Argentine lines into Paraguay and Uruguay.

## AS A BUYER OF IRON AND STEEL

In order to determine the position of Argentina as a purchaser of iron and steel products and kindred commodities, I went to the statistical division of the Department of Commerce and Industry which keeps the world informed on the status of Argentine national trade. This feature of it, with especial relation to the United States, is shown graphically in tabular form. The statistics are for 1912 since it will be one or two months before those for 1913 can be obtained; but I am advised that while some of the commodities show considerable variation in the last year the totals are not materially changed. Here is the tabular exhibit:

Article	Value	Per cent from United States
Machinery (various kinds).....	\$7,000,000	16.2
Pig and sheet iron.....	6,500,000	6.5
Galvanized iron.....	6,400,000	22.7
Steel rails.....	5,275,000	14.5
Railroad material.....	5,200,000	2.6
Railroad freight cars.....	3,950,000	14.6
Passenger cars.....	1,234,000	9.1
Steel ties.....	1,190,000	11.0
Material for bridges.....	1,034,000	6.7
Locomotives.....	2,270,000	0.0
Tramway material.....	1,514,000	5.0
Iron columns and beams.....	3,395,000	3.0
Wrought iron.....	2,853,000	11.6
Spare parts of machinery.....	2,764,000	40.5
Wire and cables for electric purposes.....	2,707,000	1.5
Galvanized wire.....	2,089,000	31.7
Galvanized iron pipes.....	1,341,000	17.7
Iron pipes other than galvanized.....	1,214,000	4.4
Iron manufactures.....	1,429,000	15.6
Bolts and nuts.....	1,101,000	16.0
Tin plates.....	1,074,000	33.3
Automobiles.....	5,346,000	10.5
Spare parts of carriages and automobiles.....	1,514,000	0.5
Motors of various kinds.....	1,184,000	55.3
Reapers.....	2,811,000	71.7
Threshing machines.....	1,572,000	80.0

I have followed the customs classification in grouping these commodities. It further should be said that under the Argentine system of *aforos* or fixed valuations, values do not always correspond with those given by exporters. For example, a typewriter in the Argentine customs classification may be subject to duty under a fixed valuation of \$75, while the exporter might place it at \$60. Similarly the exporter of a sewing machine might value it at \$50 while the Argentine customs classification would fix it at \$40. The same rule would hold with regard to machinery and other commodities.

In the tabular exhibit of the percentage of imports from the United States, where this is small it usually may be assumed that the United Kingdom is the country which has the preponderant percentage. In a few instances, such as machinery of various kinds, "pig and sheet iron," automobiles, iron columns, galvanized wire, tramway material, Germany has a larger percentage than the United Kingdom.

## OUR ARGENTINE IMPORTS WILL INCREASE

So far as relates to the balance of trade the United States has no cause of complaint in its trade relations with Argentina. For the first nine months of 1913 the Argentine imports from the United States were in round numbers \$44,000,000 and the exports to the United States \$12,000,000. This disparity of course is due to the fact that the United States is not a large importer of agricultural products while Argentina from the necessity of her situation is a large buyer of agricultural machinery and other forms of manufactures in which the United States excels.

Since the tariff has been removed from agricultural products the Argentine shipments to the United States are likely to show an appreciable increase. Some of the beef which England formerly obtained is now going to New York. The

removal of the duty on corn or maize has opened up the market for this staple product. The hard corn of Argentina seems especially suitable for corn oil. At the consulate the other day I was shown the manifests of several outgoing steamers. One cargo of corn was for Galveston, another for New Orleans, and another for New York. It is estimated that the United States will take 100,000 tons of corn annually from Argentina.

The importation of these Argentine agricultural products is not going to hurt the American farmer for they will merely supply wants that he is unable to fill. In the sense of better trade relations, they are a good thing, for the greater the quantity of agricultural products which Argentina sells in the United States the larger will be her purchases of American manufactured products.

#### OUTLOOK FOR LARGER STEEL IMPORTS

In the future it is likely that the country will be a heavier purchase of structural steel and building material. This will be due largely to the growth and to the reconstruction of the city of Buenos Aires. I knew Chicago during its greatest growing period, but proportionately Buenos Aires has beaten it. Ten years ago I was here, when the population had passed 750,000, and it was expected that in a few years the 1,000,000 mark would be reached and then there would be a halt. But the population is now close to 1,500,000 and Buenos Aires has not yet got its growth.

While the normal growth is going on there is also the reconstruction of the city proper by tearing down old buildings and putting up new structures. Buenos Aires formerly was a city of one and two-story buildings constructed after the old Spanish manner of stone and brick or thick mortar walls. This is still the characteristic feature of the city, but it is astonishing to note the way these buildings are disappearing to be replaced by edifices of six and eight stories. These new buildings are largely of steel construction, even more so I am told than similar structures in the United States. The skyscraper of twenty or thirty stories is not needed in Buenos Aires, but the transformation of business blocks from one and two-story into six and eight-story buildings is remarkable.

A careful computation of the expenditure in building in Buenos Aires for the last year fixes the amount at \$130,000,000 gold. From this it can be judged why Argentina is so good a market for structural steel and building material, including builders' hardware.

A feature of the growth of the city is the new subway system which has recently been opened. I do not suppose that many people in the United States know that Buenos Aires has subways; for, though I have been fairly familiar with the city's progress, their construction had escaped my attention. It is taken here simply as a matter of course in the development of the city and as part of the plans of municipal improvement.

#### DIRECT SHIPMENTS TO UNITED STATES

The Argentine government is not at present engaged in port improvements which call for heavy purchases of material since already so much has been done in this line, yet these improvements are going on all the time, not only in Buenos Aires but at Rosario, the great northern wheat port on the Parana, and at Bahia Blanca, the wheat port of the south, as well as at La Plata, which lies between Montevideo and Buenos Aires and which is utilized by some of the transatlantic liners that do not care to come all the way up the river channel to Buenos Aires.

A look at the vessels in the basins gives a graphic picture of the amount of the world's commerce which circulates through the port of Buenos Aires, but it makes one dizzy when the figures are handed him and he realizes that it is the eighth port of the world and in the New World second only to New York.

The shipping facilities, so far as I have been able to learn, between Buenos Aires and the Atlantic and Gulf ports, seem to be sufficient to avoid the necessity of sending freight by way of Liverpool or Hamburg as is sometimes done. There are various lines not only direct to New York but also to New Orleans and Mobile. The explanation given me of these cargoes from New York via European ports is that it is simply a matter of convenience for some of the vessels to pick up the freight at New York and bring it down to the River Plate via Europe.

#### AMERICAN AGENCIES INCREASING

Coming back to American trade with Argentina, I have noted here, as on the West Coast, the increasing tendency of American manufacturers to establish their own agencies. It is significant of the permanent basis on which the trade of the United States with these South American countries now rests. The United States Steel Products Company following its general plan was among the first to establish its own agency. Many other companies subsequently did so with advantage. This in particular is true of typewriters, cash registers, sewing machines and various office appliances. The harvester companies find it satisfactory to deal through Argentine mercantile firms, but these are firms with very large capital and for all practical purposes are the same as direct representatives. One of the great threshing machine companies some years ago established its own direct agency, with its own representative in charge and this plan I am informed has been quite successful.



Fig. 3—A Business Block on Alveor Avenue, Buenos Aires



## FINANCIAL CONDITIONS NOT THE BEST

The financial and commercial situation of Argentina at the present time calls for some comment, because the place of the country as a buyer of foreign goods is dependent on it. Fundamentally the country is financially sound because the dollar has a fixed value and its purchasing power can be depended on from day to day. The Argentine currency consists of both gold and paper issues, but the paper rests on a gold basis. It is known as national money and in foreign exchange operations the calculation is made on the relation of this money to the English pound sterling. In American money the Argentina dollar figures out about 44 cents. The gold standard is maintained through the Caja de Conversion or Bank of Conversion, which is the government institution for redeeming the money.

While Argentina is thus on a solid financial basis it cannot be gainsaid that just now the national finances are somewhat demoralized. It is partly the old story of national extravagance in a period of great prosperity, with the government committing itself to an outgo greater than the inflow. This condition exists without Argentine credit being in any way impaired, for the country's resources are ample to meet its obligations. With average crops and with all the world bidding for Argentine beef and mutton there is no reason why the present commercial crisis should not be safely weathered.

## SOME LAND INFLATION

While this is my personal view, and while Argentina should be looked on as a permanent and growing market for the products of the United States, I do not think that during the next ten years it will advance so rapidly as during the last ten years. No country can keep up the pace at which it was going. The inflation of land values went beyond all reason. An American business man long resident in Buenos Aires remarked to me that the Argentinos always would be gamblers in land, because that was their only form of legitimate gambling. He meant legitimate speculation. There are no stock exchanges of importance and especially no mining stocks. Railroad and other stocks are dealt in in Buenos Aires, but the real Argentine stock market is in London, where the shares of the railroad companies, the frozen meat companies, and similar concerns are listed.

The system of selling lands is by public auction on the instalment plan. This is where the speculative element in human nature is worked on. The plan of instalment payments also gives the opportunity for persons of small means to indulge in the speculative mania and thus land gambling becomes almost universal. The result of this condition has been that Argentine land values have been forced far beyond their natural basis. Now that the economic law is working and they are coming down to something like normal prices, the subsidence of the boom causes the usual hardship. Not only the small speculators are crowded out, but many buyers of supposed ample means who bought on speculation find themselves embarrassed.

The banks appear to have handled the situation about as well as financial institutions can do when practically all the people of a country get a craze for speculating in land. I am assured that bank loans on lands are not large, relatively speaking, and that from the beginning of the boom most of them have been conservative. But while banks can refuse loans to their customers who offer land as

security they cannot prevent customers who get accommodations for business purposes from speculating in land. That is one trouble in the present situation and the land speculation undoubtedly has much to do with the commercial crisis. I am informed that where a firm or individual can show that there has been no land speculation the bank affords the means of tiding over the emergency but in a very large number of instances the evidences of land gambling appear. In these cases there is nothing to do and nothing is done so that the failures follow. These are very numerous and the whole commercial community of Buenos Aires feels them. It may take another year or two years before the crisis is over but the process while severe is a natural one and Buenos Aires and Argentina will survive it.

While the crisis exists it is necessary to distinguish between a commercial crisis and a financial panic. There is no danger of a panic such as that which occurred in 1890 when the collapse in Argentine land values started a panic in London which went round the world. That cannot happen again today. The situation as to the collapsed land boom is a domestic and not an international one. In the meantime Argentina's productive capacity has increased enormously and the increase in the value of agricultural products enables her to maintain her commanding position in the world's markets. American manufacturers should keep this in mind. They are getting such a firm hold in the Argentine market that they should continue to develop it, regardless of temporary commercial disturbances of a domestic character.

## The Eastern Railroad Rate Case

The definite statement, widely published, that the Eastern railroads "will receive relief from the Interstate Commerce Commission on April 1," is entirely misleading, and is based solely upon the fact that the carriers, after a conference with members of the commission, have appointed a committee to revise their existing tariffs for the purpose of canceling all allowances to industrial lines, in accordance with the understanding between the shippers and the carriers when the case was first presented to the commission for its consideration. The revised tariffs, it is semi-officially announced, will take effect April 1. The "relief" which the carriers will secure on that date, therefore, is simply the curtailment of a drain upon their revenues diverted to favored shippers which is estimated by the commission to approximate \$15,000,000.

Some of the most experienced observers in Washington are of the opinion that the commission will announce a small advance of less than 5 per cent. just before June 1 and probably on Friday, May 29. The interval will be fully occupied in accordance with the regular procedure of the commission. The date mentioned is selected for the reason that it is followed by two holidays, namely, Decoration Day and Sunday, and because the commission has frequently manifested a disposition to make its most important announcements at a time when they will be least calculated to stimulate stock market speculation.

The L. C. Smith Building in Seattle, Wash., said to be the tallest building in the world outside of New York City, is fitted throughout with Byers genuine wrought-iron pipe, manufactured by the A. M. Byers Company, Pittsburgh. Byers pipe is made from all pig-iron muck bar, without the use of scrap of any description.



### Center-Drive Railroad Axle Gap Lathe

For use in railroad shops where it is desired to turn the journals of car axles without removing the wheels, the Bridgeford Machine Tool Works, Rochester, N. Y., has placed on the market a center drive gap lathe with two carriages. As the work can be done without removing the wheels from the axles, it is pointed out that considerable savings in both time and expense are secured, and by the use of two carriages it is possible to refinish both ends of the axle simultaneously. This machine is generally placed in a pit.

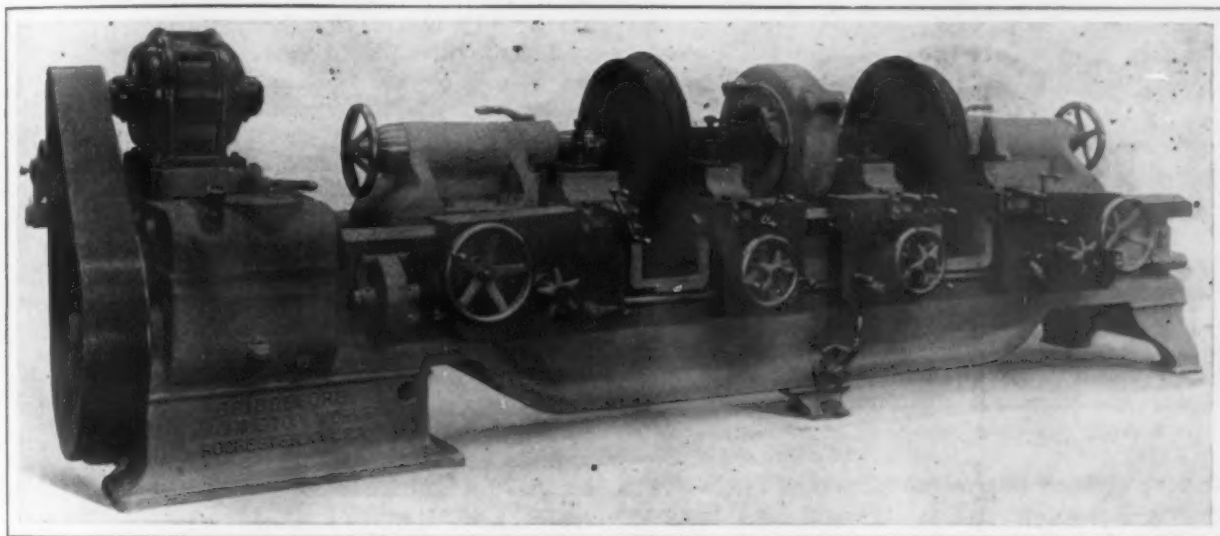
The general construction of the new machine is similar to the builder's regular line of axle lathes. The tailstocks have a bearing on the bed of 24 in. and are secured in position by four heavy bolts and binders. The spindles, which have tool steel centers 2 7/16 in. in diameter, are adjusted by screws and handwheels and are clamped by split binders. The minimum distance between the centers is 54 in. and the maximum is 105 in. The swing over the ways is 27 in., 13 1/2 in. over the carriage and 45 in. in the gap.

The power is supplied from an overhead countershaft, through an 8-in. belt, running over a

the machine. For lifting this the pull pin is pushed in place and the nuts are released. For convenience in raising an eye bolt is placed on the upper half of the head and a rope with weights operating through a set of sheaves can be attached to it for lifting and lowering the head.

The carriages are driven by a splined feed shaft, 1 15/16 in. in diameter, through a rack and pinion. The rack, which is of steel, is 5/8 in. wide and is of 6 pitch. A bearing of 30 in. on the V's is provided for the carriages, and in addition there is one on the back of the bed, which is relied upon to take up the forward thrust and overcome the tendency toward rising from the V's when the burnisher is used. The carriages are independent of each other and the direction of the feed can be changed at the apron. There are four changes of feed, ranging from 1/16 to 3/16 in. per revolution of the axle and the variation can be obtained instantly through a feed box.

For the refinishing of locomotive and tender axles having inside bearings the machine can be equipped with two extra inside carriages, as illustrated. With these extra carriages, it is pointed out that the machine will handle any axle repair



A Center Drive Gap Lathe Designed for Use in Railroad Shops Arranged for Turning the Journals of Locomotive and Tender Axles Having Inside Bearings

pulley 30 in. in diameter to a constant-speed pulley of the same size on the lathe. A speed variator provides three changes in the cutting speed. These changes are accomplished by shifting levers conveniently located on the case, which control the engagement of cut steel gears running in oil. The power is transmitted from the speed variator to the driving head by a shaft placed within the frame. Tight and loose pulleys 24 in. in diameter and having sufficient face width for a 10-in. belt, are mounted on the countershaft. The loose pulley is brass lined and the hangers used for the shaft are of the self-oiling type.

Drivers operating on the same principle as the self-centering steel driver furnished with the builder's regular axle lathe is used for driving the axle. The driving gear is made in two parts of tongue and groove construction and is bolted together by four hinge bolts and nuts. It is pointed out that less than one-half turn of each nut is all that is necessary to release the gear, so that it may be opened to permit the entrance of an axle and pair of wheels. The upper half of the head operates on a heavy hinge stud placed in front of

work that may be necessary on car, engine or tender truck axles. It is also possible to arrange the machine to swing 55 in. in the gap to accommodate trailer truck axles.

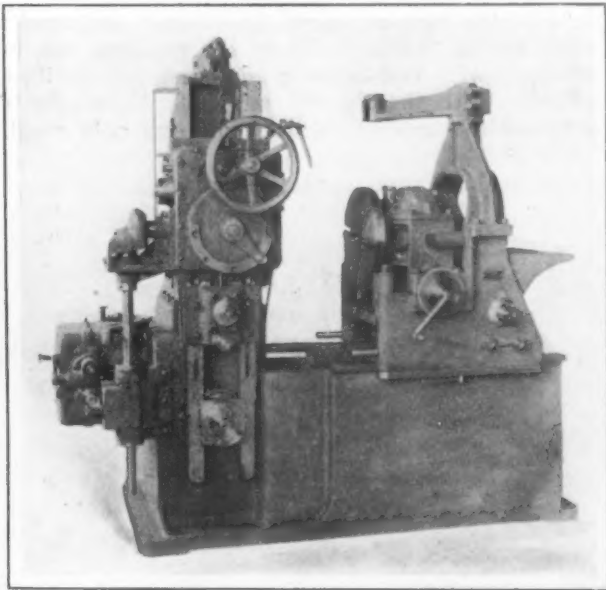
### Safety Committees of Workmen

A plan has been formulated in the State of Washington to prevent accidents in all mills and factories. At the request of Governor Lister the industrial insurance commission and the State labor department have conferred with the result that safety committees of workmen are being organized in all plants in the State. These committees will consist of three workmen whose duty it will be to receive reports from other employees as to defects in machinery or other dangerous conditions and as to carelessness on the part of other workmen, as well as to do safety work on their own initiative. Statistics of the industrial insurance commission indicate that less than 3 per cent. of all accidents are due to unsafe machinery, the majority resulting from carelessness. It is hoped to reduce these largely by the new plan, which is receiving active co-operation everywhere.

## A NEW CAM MILLING MACHINE

### The Rowbottom Machine Company's Design for Making Cams of All Kinds

The cam milling machine, which is shown in the illustrations, is designed for the manufacture of all kinds of cams in general use, including the face, box, drum and side types, without the use of special attachments. The machine is driven by a single belt from a two-speed countershaft, all other speed changes for the work and cutter spindles being obtained by gearing, the action of a lever in combination with the countershaft giving eight cutter speeds and eight changes of the feed. The work and cutter spindles can be run in either direction independently of one another, which makes possible the use of either right or left hand cutters, and also the feed can be in the direction best suited



A Recently Developed Universal Cam Milling Machine

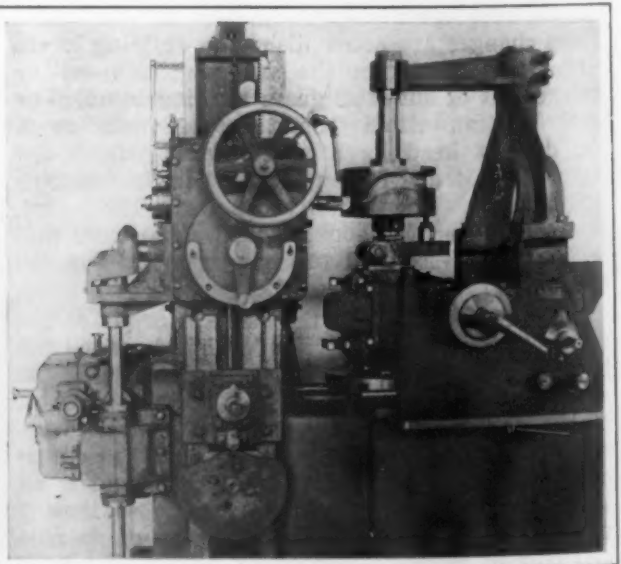
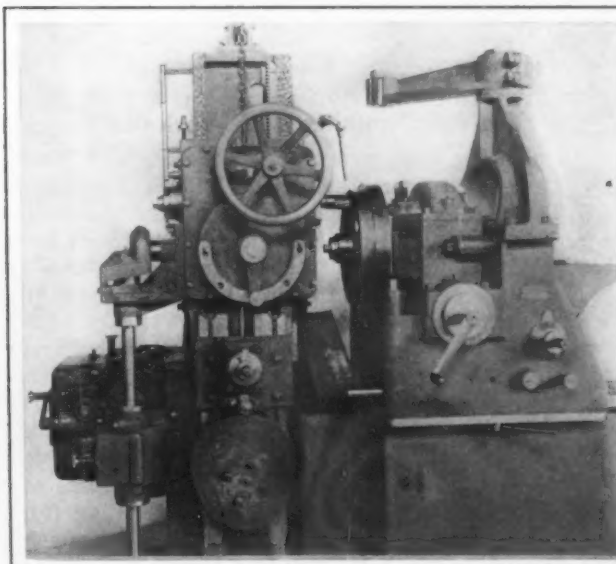
for the style of cam or the shape and angle of the groove to be cut.

The cutter spindle slide operates vertically following the shape of the master cam by its own weight, which is regulated by counterweights. The master cam is mounted on the end of the spindle which rotates between the two extended guides of

the slide below the cutter gear box. Between the master cam and the gear box is a bracket carrying the follower roll of the master cam. The bracket is adjustable on the slide extensions, is connected to the main body of the slide by an adjusting screw and is operated by a crank handle. By this adjustment the cutter spindle is brought to the required radius on the cam and is measured off by the pointer and scale on the left side of the cutter head. In conjunction with the micrometer dial on the roll bracket measurements to 0.001 in. can be obtained. The slide is raised quickly by the handwheel and held by a ratchet and pawl in any position while changing cutters.

The work head has a lateral motion on the bed to and from the cutter, obtained through a hand crank lever, and is provided with a micrometer dial for the direct and accurate measurement of the depth of groove. The spindle is instantly disconnected from the driving mechanism and the master cam when it is desired to turn the work by hand in the adjustment of the blank, the adjustment being as fine as  $\frac{1}{4}$  deg. In one of the engravings the machine is shown with the work spindle parallel with the cutter spindle, and the spindle bearing bolted to the upward extension of the work head, as required for cutting face or box cams. The work is secured to the faceplate, which is forged solid with the spindle and is provided with a No. 12 B. & S. taper hole for the work arbors. The under part of the faceplate has a bearing which adds to the rigidity of the machine. The only overhanging parts are the cutter and the work. The work spindle bearing is rotated forward on its trunnions through an angle of 90 deg. and is bolted to the front part of the work head, which brings the axis of the work spindle to a vertical position. Its other end does the work, being provided with a No. 12 B. & S. taper hole for arbors and an arm to carry the driving stud. The vertical arbor is supported at the upper end by an overhanging arm which is easily detached by a slip bushing and swung out of the way. Drawback bolts through the spindle are furnished for the cutter and work arbors. A flat plate master cam is used for all styles of cams which is an economical arrangement in fashioning the drum and side types.

The capacity of the machine is face cams up to 28 in. in diameter, box cams up to 32 in. outside diameter, and barrel cams up to 24 in. in diameter with an 11-in. throw. Its weight is 4500 lb.

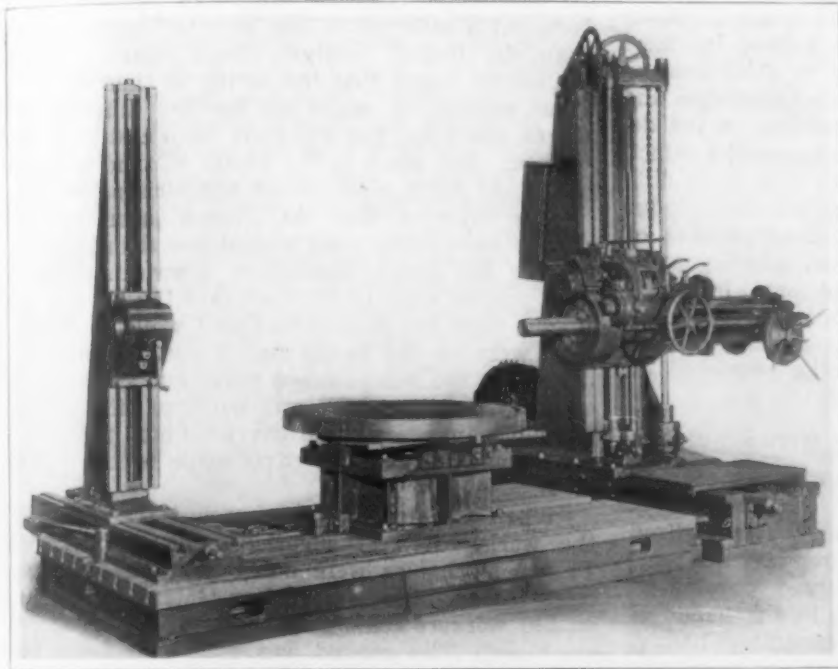


Two Views of the Machine Showing the Work, Master Cam and Cutter in Place and Also Arranged for Cutting Side and Drum Cams

## Floor Boring Machine with Rotary Table

The Detrick & Harvey Machine Company, Baltimore, Md., is equipping its No. 2 horizontal boring, drilling and milling machine with a thread chasing attachment, rotary table with removable sub-base and a standard outboard bearing. This equipment enables the machine to be used for drilling, boring, milling, tapping, reaming and thread chasing.

The saddle is counterbalanced and has a vertical travel of 60 in. on the column. The spindle,



A Floor Type Horizontal Combination Drilling, Boring and Milling Machine Equipped with a Rotary Table and a Thread Chasing Attachment

which is of high carbon hammered steel, is 5 in. in diameter and is driven from the front or working end. There are eight feeds ranging from 0.007 to 0.220 in. per revolution of the spindle and there is a continuous feed of 48 in. There are 12 spindle speeds available, with either a constant-speed or a 2 to 1 adjustable-speed motor or belt drive. The range covered is from 4 to 115 r.p.m.

The saddle and column have eight milling feeds ranging from 0.01 to 0.30 in. per revolution of the spindle, all of which can be reversed, together with the speeds. The arrangement of the speeds and feeds is such that they are non-conflicting and can be controlled from the platform. Rapid traverse is provided for both the spindle and column and there is a quick hand adjustment for the spindle. A handwheel on the saddle is used for all hand movements to the saddle and the column. These two parts have narrow guides and taper steel gibs are used on all sliding fits. A standard travel of 60 in. is provided for the columns on the runway, but this can be varied to suit the requirements of the purchaser.

The thread chasing attachment is driven from the feed and is located on the rear of the saddle horn. Provision is made to prevent it from being thrown into action when the spindle is feeding. The change gears are arranged like those on a lathe, and it is possible to cut any of the customary numbers of threads per inch by the use of change gears.

The rotary table is 60 in. in diameter and is rotated by hand only. A sub-base is furnished which can be removed when it is desired to bring

the top of the table closer to the floor plate. The height of the table is 27 in. with the sub-base and 15½ in. without. A rack and pinion and lever arrangement is employed for moving the table along the floor. The graduations on the table read to ½ deg. and a dial is provided for that purpose.

## Westinghouse Electric Veterans Organize

On the evening of February 21, at Pittsburgh, the Veteran Employees' Association of the Westinghouse Electric & Mfg. Company was organized by men who have been in its employ 20 years or more. About 325 are eligible to membership, and about 315 were present at the meeting. By-laws were adopted and officers elected. Following a dinner, an interesting programme was carried out consisting of speeches and vaudeville. The toastmaster was L. A. Osborne, vice-president of the company. The speakers were E. M. Herr, president; Charles A. Terry, vice-president, and James J. Barrett, representing the shops. Mr. Herr promised the support of the company to the organization, and also stated that the officials were working on a pension plan for the employees, details of which will be announced later. Guy E. Tripp, chairman of the board of directors, was present and was elected an honorary member of the association, as was also Mr. Herr, neither having been connected with the company the required number of years. A standing toast was drunk to George Westinghouse, who was prevented from attending by illness.

## German Tool Makers and the New Tariff

The annual report for 1913 of the Society of German Machine Tool Makers points out that the new American tariff made a substantial reduction in the duties on machine tools and thus considerably reduced the inequality between German and American duties, but leaves it still big enough. It continues: "The question of the ability of German machines to compete in the United States is, therefore, under more lively discussion. It will be possible for the manufacturers of German machine tools of special kinds to sell both large and small sizes in the United States, but in view of the amount of capital invested in American shops it will be difficult to develop a profitable business there of any considerable dimensions, as the Americans would exert themselves energetically to exclude foreign machines."

The new plant of C. H. Besly & Co., Chicago, at Beloit, Wis., will be ready for occupancy and at least partial operation by April 15, according to the contractor, Newton Engineering Company, Milwaukee. The main building is now receiving the finishing touches and the installation of equipment has been started. The power plant is stated to be a model in water-power design and will provide an abundance of generating power. The entire plant will be electrically driven. In the meantime the old works is being operated at full capacity in taking care of the demand for Besly grinding and polishing machinery.

A first dividend of 5 per cent. has been declared in favor of the creditors of the Wisconsin Engine Company, Corliss, Wis. The company went into the hands of a receiver a year ago.



# Jigs and Fixtures as Substitutes for Skill

A Question Whether or Not with Increasing International Competition Too Much Dependence Is Not Being Placed on Templates in Machine Operations

—BY STERLING H. BUNNELL—

The gradually increasing direct competition between the United States and other nations makes comparison of practices and methods of manufacture matters of great and general interest. Many of the observed differences are caused by mere circumstances; others, by reason of differences in the character of the operatives' knowledge and skill; and some, because of differences in the demands of purchasers of the manufactured product. These variations are so universal that it is difficult to get a uniform basis from which to judge of the relative advantages and disadvantages of various ways of working out manufacturing problems. There are, however, occasional instances where identical articles are made in several countries simultaneously, so that one set of variables is eliminated, and methods may be compared on the basis of the results produced.

## SKILLED MECHANICS IN FRANCE WITHOUT JIGS

A recent opportunity was afforded for comparing French, German and American practice in manufacturing machines of closely standardized character. These machines were invented and brought to working condition abroad, covered by patents in all countries, and put in the hands of separate corporations in the three countries named. The French shop was manned by skilled mechanics paid the going rate of wages in that locality, which is about one-third the average wage paid in the United States to men capable of doing the same class of work with equal skill. These machinists turned out the work on standard lathes, planers, millers and grinders of types familiar in the United States—many of the tools were in fact of American make. The parts turned out were, by French judgment, of interchangeable grade. In the first year or so of the operation, assembling was done by picking out from the stock on hand the parts which best fitted together. As the fitting was done with care, the resulting machines worked excellently. The machining, though hand-calipered and measured throughout, was evidently quite close to standard dimensions.

The American manufacturer commenced by making a careful drafting room study of the French machines, and proceeded to design a full set of jigs and fixtures to insure interchangeable work. It appeared that the foreign method of trying parts to select those that fitted best could not fail to cause a large loss of time, and must indicate a want of careful gauging and inspection of the machine tools. Fixtures were, therefore, made to insure accurately identical sizes for all pieces made by them. Following the regular practice in this country, all possible operations were arranged for machines to be operated by men not skilled machinists, and at the greatest possible speed. The entire work of fitting up and starting to make four sizes of the machines in America took a year or more. The machines when they came through at last completed were made of parts fully interchangeable, they performed properly when tried out, and were superior in finish to the French prototypes.

## LABOR CHARGES NOT HIGH IN COMPARISON

Under these circumstances there could hardly be any doubt that the American practice would turn out a machine in less minutes' working time than the French methods could attain. It was confidently hoped that the saving in time would be great enough to make up for the difference in wages, and bring the American labor cost below the French. But when in the course of time an interchange of visits made direct comparisons possible, it was observed that the French labor cost for strictly hand-fitted work totaled less than the labor cost by the highly specialized American methods. This was in spite of the fact that the French mechanics were full paid, skilled men, while the Americans were of the handy-man grade. It was evident that the hand-gauged parts had improved in accuracy, so that there was no more difficulty appreciable in assembling the machines than with the absolutely standard parts made by the fixture method.

When the investigation reached the details of the work, the real surprise came. The skilled French mechanics were doing many of their machine-tool operations as fast or faster than the jig-guided workers could feed their turret and special machines. The ground was gone over again and again, but no other conclusion could be reached. It should be noted, however, that the American force had not been long employed on this work, so that it was probable that the operators would be gradually speeded up enough to effect a considerable saving over the cost in the early stages.

## GERMAN LOWER THAN FRENCH COSTS

While the American shop was working out its problems, the German manufacturers closed their contract and started to get out the necessary selling information and manufacturing equipment. They designed and completed their fixtures in about one-third of the time the same work had required in the United States. Their equipment of fixtures was effective and complete, and cost much less than the American outfit. The German workmen put on the manufacturing operations were not more expertly skilled than the French machinists, but graded considerably higher than the usual machine-tender of American shops. The German workers were expected to build the machines at a lower cost than the French force could reach. If this were other than a patented machine with competition restricted, the advantage in the possible selling price based on manufacturing cost would evidently rest with the German shop.

Since material and labor cost more in the United States, and cost and upkeep on the large outfit of jigs and fixtures usually provided in American practice is great, American built machines may generally be expected to cost more than similar machines built in European countries. At the same time, the separate operations performed in an American shop are usually speeded to the point where they equal or better the time of corresponding operations abroad. When this point is reached the direct cost of the American work should com-

pare favorably with the work of the foreign competitors. This condition is in itself satisfying to cost accountant and management. There is, though, a disquieting feature which is generally overlooked. It is

#### THE INFLEXIBILITY OF JIG-GUIDED OPERATIONS

It is rarely possible to wear out a fixture in use, yet every change in design sends fixtures to the scrap pile or leaves them to encumber the shelves of the tool room and form an apparent but valueless item of the assets. In connection with those lines of machinery which are built to annual fashion plates, like automobiles, the scrapping of the entire fixture equipment after a season's use is expected, and its replacement is provided for in the cost accounting. But in the many lines of manufacture where seasonal changes do not occur, it is rare to find adequate provision made for writing off the value of templates, gauges and other things which have been made useless by the progress of the art.

The basic reason for the use of jigs and fixtures is the resulting reduction in cost of constructing the machine or device. The equipment once made crystallizes capital in rigid form, where any attempt at modification results in destroying the capital. Evidently the jig equipment should be the minimum which will meet the requirements. This minimum will be set by the maximum of trade workers' skill which can be obtained at reasonable price. Cheap men need expensive jigs, highly skilled men need little outside of their tool chests. But, when the inevitable change in design comes, the jigs must go in the scrap heap, and money must be found for more, whereas the skilled men are ready for new work at any time. Here, American practice has much to learn from other countries, which are maintaining and increasing their supplies of competent trade workers.

#### JIGS AT THE EXPENSE OF TRAINING WORKMEN

It begins to be a serious question whether we have not gone much too far in this country in the direction of developing tool designers and tool makers, to the total neglect of training skilled machinists. Generally speaking, a man with a moderate degree of education along practical lines is a more interested, adaptable and profitable worker than is an ignorant plodder at laborers' pay. Factory managers hesitate to spend money on the trade education of their employees along lines of permanent usefulness, but think little of putting thousands of dollars into cast iron and steel fixtures of transitory value. The burden charges of factories consist of interest, depreciation and repairs on matters belonging to capital account, salaries of intelligent non-producers, and wages of unskilled laboring help. It is a dangerous state of affairs when the burden charges of American factories amount to far more than the wages paid to the factory workers, while the latter grow fewer in numbers and less skillful in the details of their trade.

The widespread interest in educational opportunities for employees, shown by the increasing number of large works, making definite provision for apprenticeship and technical courses, is a hopeful sign today in the United States. Practical trade or industrial training may or may not become a function of the State in this country, as in Germany. But in either event the maintenance of apprenticeship courses providing for mental as well as manual training is certain to be directly profitable to the employer as well as to the employee. The advantage will begin with the increasing

value of the employee's services while learning. It will continue as the apprentice develops into a skilled, intelligent and resourceful journeyman, ready to take his part in developing ways and means of handling new tasks and getting out new lines of product. It will reach its greatest breadth and strength when after a few years it will no longer be necessary as at present for the few remaining competent American mechanics to crystallize their knowledge into unchangeable iron and steel jigs to supply the place of brains and fingers for the multitude of tradeless laborers.

#### Industrial Management at Brown

The changes which have occurred in the conduct of industrial operations from the conditions which existed a century ago to those which are now peculiar to scientific management were outlined at length in an address Thursday afternoon, February 19, at Brown University, Providence, R. I., by Dr. H. S. Person, director Tuck School of Administration and Finance, Dartmouth College. His was the first of a series of lectures to be given in connection with a course on industrial management inaugurated at Brown University by Prof. J. Ansel Brooks, of the department of mechanical engineering.

Dr. Person noted the non-systematic industrial methods of 1800, with their slight specialization in occupation; the introduction of systematizing in the latter part of the last century, accompanied by moderate specialization, and the beginnings of scientific methods about 1900, with extreme specialization. The last transition he attributed to intense competition and narrowing of profits resulting from such agencies as increased transportation facilities which have worked to destroy isolated markets. It is the engineer, he said, and not the business man who brought about the change. The engineer attacked the industrial problem in the scientific manner he learned to practice in the engineering school. Now there is disciplined study and experiment as contrasted with methods based on chance, tradition and imitation. Dr. Person defined management as the direction of forces to accomplish a given result, and administration as the determination of policy and the superintendence of management. Organization, he continued, is the anatomy rather than the physiology of a business, the cross-section of it, so to speak—the relationship of parts joined together in some way. Organization he regarded as the static feature contrasted with management and administration, dynamic features.

Some of the other lectures arranged for are as follows:

Morris L. Cooke, director of public works, Philadelphia, "The Influence of Scientific Management on the Problem of Casual Employment," March 13.

Frederick W. Taylor, consulting engineer, Philadelphia, "Scientific Management," March 16.

Robert T. Kent, editor Industrial Engineering, New York, "Stores and Storerooms," March 23.

Edgar Whitaker, consulting engineer, Providence, "Cost Systems."

Frank B. Gilbreth, consulting engineer, New York, "Scientific Management."

A. R. Shipley, New England Butt Company, Providence, "Routing," April 23.

Frederick E. Cooper, with Frank B. Gilbreth, Providence, "Motion Study," April 30.

Professor Colvin, Brown University, "Psychology and Scientific Management," May 7.

Hon. William C. Redfield, secretary Department of Commerce, Washington, D. C., "Effectiveness," May 13.

Professor Bristol, Brown University, "Sociology and Scientific Management," May 21.



# Illumination in a Cleveland Factory

Notably Satisfactory Results in Manufacturing Rooms and Offices of Cleveland Hardware Company—How the Electric Lamps Are Distributed

BY F. L. PRENTISS



The Water Tank Illuminated

In modern factory construction no object is probably being given more attention than artificial lighting. "Daylight factory construction" is one of the slogans of highest efficiency and the best that can be had in artificial illumination is of equal importance. Both go hand in hand in the "safety first" movement, for accidents in a manufacturing plant cannot be reduced to a minimum unless the plant is well lighted. Illuminating engineering has done much to improve artificial lighting in factories and new developments that have made available better and higher powered lamps have been an important factor in the better lighting movement.

The important requirements for good artificial illumination in the factory include proper intensity of illumination, satisfactory uniformity of intensity and efficiency of operation. The first cost is also a factor in laying out the installation, but it is regarded as poor economy to save in the cost of the installation at the expense of the lighting requirements. Results experienced by plant managers, because of the improved artificial lighting, include increased plant efficiency, increased production, better workmanship and better products, the safety of employees, and the conservation of their eyesight. To provide a better light than daylight is the aim of illuminating engineers and the steady, uniform lighting in some plants having modern lighting installations certainly has some advantages over that derived from uncertain and varying outside light. However, as long as sunlight can be had without cost it will doubtless be continued in use as much as possible for factory lighting.

An interesting example of modern factory lighting is found in the new building at the No. 1 plant of the Cleveland Hardware Company, Cleveland, Ohio.

This consists of a five-story and basement building 80 ft. x 160 ft. in size. Each of the four lower floors and basement are used for manufacturing purposes and are divided by the structural steel columns into fifty-two 12 x 20 ft. bays. On the fifth floor, which is used for general office purposes, the alternate rows of columns are omitted, increasing the size of the bays to 12 x 24 ft. The ceiling height of the basement is 10 ft., that of the first four floors 12 ft. and that of the fifth floor 14 ft. The lighting system is the same for the basement, first, second, third and fourth floors, and consists of 150-watt clear Mazda lamps equipped with Holophane-D'Olier 18-in. enameled steel reflectors spaced 12 x 13 ft. between centers and 9½ ft. above the floor. The average intensity of illumination is approximately 5 foot-candles. Typical arrangements of the lamps are shown in two of the accompanying illustrations, one being a view of the press room and another a view of the basement. These and the engraving showing the office room were made from untouched photographs taken at night without flash lights.

In laying out the lighting installation for a factory of this class it is the general practice of illuminating engineers to provide in the neighborhood of one watt per square foot of floor area. For factory purposes 100 and 150 watt lamps are regarded as most satisfactory for general illumination, although 250-watt lamps may be used in shops where no fine machine or bench work is to be done. The use of 150-watt lamps was regarded as desirable in this plant, but the bays are of such a size that the proper amount of wattage could not be provided with an absolutely regular installation. The staggered arrangement was accordingly decided upon, which is indicated by the fact that the lamps are spaced 12 x 13 ft. between centers in 12 x 20 ft. bays. With this arrangement the lamps appear in a straight row in the center of the bays looking



Lighting in the Basement



crossways from one side of a floor to the other, but the staggered arrangement is shown by looking down the length of the rooms as is illustrated. Starting on one side of a floor the first lamp is placed  $3\frac{1}{2}$  ft. from the outside wall and the rest are in a straight row 13 ft. apart in the 20 ft. long bays, with lamps similarly located in alternate bays. In the next bay the first lamp is placed 10 ft. from the wall and the rest are spaced 13 ft. apart, and the lamps in every alternate bay are similarly located. With this arrangement some bays have two lamps and others only one. With the staggered arrangement practically a uniform illumination is secured throughout the room except at points along the side walls where the lamps are further from the wall than in the two directly adjoining bays.

Following the practice of placing lamps  $7\frac{1}{2}$  to 8 ft. above the work in order to secure the highest average intensity and most satisfactory

above the roof trusses. Between the general office room and the private offices are wide aisles. The private offices are separated by partitions of clear glass from 4 ft. above the floor to within 2 ft. of the ceiling. The saw-tooth roof construction allows the north light coming through the vertical windows to fall on the desks of the general clerical force in such a manner that all direct light comes from over the shoulders, and in addition there is considerable reflected light thrown down upon the desks from the slant of the concrete roof.

In each of the five center bays over which the saw-tooth roof extends, 20 outlets were provided, these being placed below the windows on the vertical face of the roof 2 ft. above the ceiling girders and 16 ft. above the floor. Each of these 100 outlets is equipped with a 100-watt bowl-frosted Mazda lamp fitted with an 8-in. Sudan glass reflector, smooth inside. These were supported by



Illumination in the Press Room

results, the lamps are located  $9\frac{1}{2}$  ft. above the floor, or  $2\frac{1}{2}$  ft. from the ceiling on the manufacturing floors except the basement. The extensive type of reflectors are used in order to diffuse the light and have it well distributed. The efficiency of a complete unit depends somewhat on the area of the reflector, but beyond a certain point the efficiency does not increase sufficiently to warrant the use of larger reflectors. The installation provides a very uniform illumination throughout the plant, reflecting the light where it is needed on machine work and providing an abundance of light at the back as well as the front of presses and other machinery and eliminating dark corners and shadows. This lighting is in marked contrast with the old time method still used in many shops of providing a 16-candle-power lamp suspended from a cord in front of each operator working on a press and leaving the remainder of the room in partial darkness, and it is also a decided improvement over the partial illumination of a forge shop by a few flickering enclosed arc lamps, often aided by the light from some unused furnaces.

On the fifth floor, which is used exclusively for offices, the lighting layout is unique. A large part of this floor is taken up by one large room that occupies the two center bays and is used for the regular clerical force. Over these two center bays and extending over five of the sections the roof is of saw-tooth, the peaks of the roof being 10 ft.

a fixture in such a manner that the lamps pointed upward at the slant roof at an angle of 30 degrees with the horizontal. However, after the lamps had been used some time it was decided, because of the soot and dirt that accumulated, to reverse their position so that the reflectors now point downward at an angle of 30 degrees from the horizontal and do not require as frequent cleaning as in the former position. The use of bowl-frosted lamps obviates any danger of glare in the eyes of persons who may be facing in the direction in which the units are visible. As a result of a photometric test in this room at a plane level with the desk tops, the average intensity of illumination was found to be approximately 5 foot-candles.

The lighting arrangement in the large office room is such that not only the clerical force has an abundance of light—the illumination being diffuse and uniform throughout the room—but there is an entire absence of shadows and all eye strain is avoided. The view of the office shows the effective artificial lighting of this room, no single lamp being visible from the position where the photograph was taken, the lamps being located on the vertical face of the roof about 13 ft. above the work. This installation is in marked contrast with the usual form of office lighting with an unsightly cord and drop light over each desk.

The private offices are lighted by 250-watt clear Mazda lamps equipped with 12-in. Sudan reflectors,

smooth inside and suspended in an inverted position 9 ft. above the floor. The intensity of illumination in an office 12 ft. 6 in. by 11 ft. 7 in. equipped with a single unit was found by a test to be approximately 3.6 foot-candles. However, when this test was made the lamps had not been cleaned for a number of weeks.

In connection with the inside lighting, a novel method of sign illumination is provided. On the roof of the building is a wooden water tank 18 ft. high and 18 ft. in diameter with a base 25 ft. above the roof. On the black background of the tank the name of the company is painted on each side in four rows of white letters. It was desired that when illuminated the sign should be visible as far at night as during the day and this required a high intensity of illumination. The use of angle reflectors located in front of the tank and level with the upper edge was regarded as unsatisfactory because the intensity of the illumination would

the day time. As the slightly re-touched night photograph from which the illustration shown at the beginning of this article was reproduced was made with an exposure of only 18 min., as compared with the 25 min. exposure usually given, the brilliancy of the sign is apparent. The advantages of this method of sign lighting in addition to the absence of overhanging reflectors include the accessibility of the units for cleaning and inspection and a low cost of installation.

The installation as outlined was approved and recommended by the Engineering department of the National Lamp Works of General Electric Company, Cleveland, Ohio.

#### Thomas Iron Company Bond Issue

At a special meeting of the stockholders of the Thomas Iron Company held at Hokendauqua, Pa., February 26, it was almost unanimously voted to authorize the issuance of \$1,000,000 in 20-year bonds, \$600,000



The General Offices by Night. This and preceding pictures are from untouched photographs.

not have been uniform at the top and base of the sign and the appearance of the reflectors would have been unsightly. The use of projectors very similar to automobile head lights although considerably larger was decided upon. Two 100-watt 110-volt concentrated filament Mazda lamps fitted with silvered parabolic projectors are used on each side of the sign. The units of each pair of projectors are located on supports about 15 ft. apart and 50 ft. from the sign and slightly below it. A wooden box with clear glass front protects the lamps and reflectors from the weather. By determining the correct focus of the lamps it was possible to concentrate practically all of the light upon the sign. The four lamps consume a total of 400 watts. It is stated that it is possible to read the sign at a greater distance at night than during

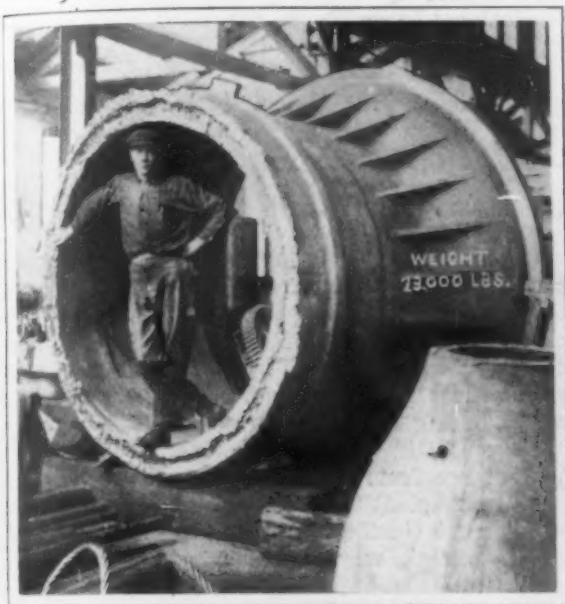
to be issued at once, \$400,000 being retained in the treasury, to be issued only after submitting the question to the stockholders. More stock was represented than at any previous meeting of the company and the vote showed 43,973 shares in favor of the bond issue and only 715 against. The total issue is 50,000 shares. It is stated that \$400,000 will be applied towards the payment of the floating indebtedness and that \$150,000 will be used for present needs as working capital. No extensions to the company's plants are in contemplation now, but repairs will be made on No. 3 furnace at Hokendauqua and No. 8 furnace at Alburtis.

In the discussions and reports at the above meeting it was shown that the company in its 60 years of continuous operation had spent \$100,123,000 for materials, supplies and labor. It is now operating one furnace at Alburtis, one at Hokendauqua, its magnetic iron mine (Richard mine) near Wharton, N. J., and one small local hematite mine in Lehigh County, Pa.



## A Large Manganese Bronze Casting

The accompanying illustration shows a manganese bronze casting which was recently made and is to be machined by the Exeter Machine Works, Pittston, Pa., for the Board of Water Supply, New York City. The casting weighs 23,000 lb. in the rough and is one of the shells for a 48-in. riser valve. The total weight of the valve completed is



Shell for 48-in. Valve Cast of Manganese Bronze

30,000 lb. The company is also making a number of these valves similar except that they are 72 in. in diameter and weigh complete no less than 46,000 lb. each. All of the manganese bronze furnished on the one order will weigh a little over 1,000,000 lb. The tensile strength of the castings ranges in many cases, it is stated, above 75,000 lb., and the tensile strength of the rods forged exceeds 80,000 lb. per square inch.

The company's present capacity for pouring manganese bronze is 25 tons. The shell of the casting is made in loam. All other heavy parts are made in dry sand and the smaller castings, up to 100 lb., are made in green sand. The mixture is first made up and then poured into ingots and the ingots are again melted and poured from pit crucibles (using coke and anthracite coal), direct into a 24,000-lb. ladle. The material is then transferred by overhead traveling crane and poured into the molds. It requires in the neighborhood of 20 per cent. of the material poured in the risers, the metal shrinking rapidly, and in all cases the company has secured a clean casting. It is believed that the valves are the largest manganese bronze castings ever made in this country.

The Exeter Machine Works makes traveling, locomotive and portable cranes, hoisting and other engines and buckets.

## Steel Foundries Slack

Steel foundry operations at Chester, Pa., are slacker than they have been in many years. In the city proper there are six foundries, two of which are closed entirely; the other four are running from 25 to 50 per cent. of capacity. In the immediate vicinity there are also one open-hearth and two converter foundries, one of the former reporting a good volume of business. Some plants that regularly make 15 to 25 heats per week are tapping only five or six and closing down two to three days each week. The principal cause is lack of orders from the railroads.

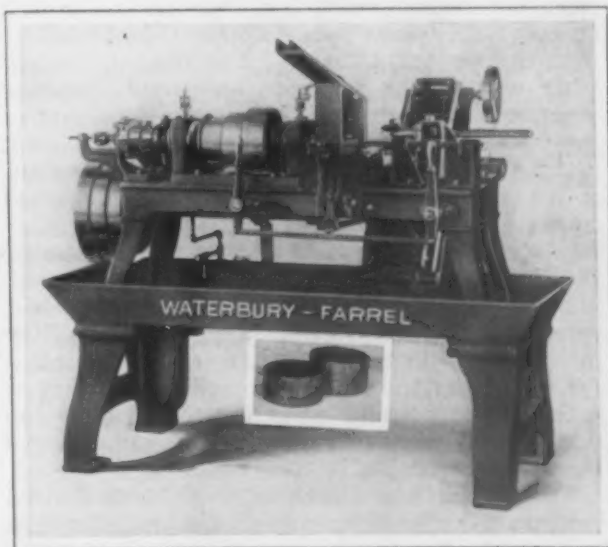
## Edging Machine for Drawn Steel Shells

For edging the drawn shells used in the manufacture of articles made of pressed and formed steel the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., has brought out a number of machines. These take the drawn shell after it leaves the press and trim the slightly ragged edge and in addition to smoothing the edge also cut the shell to the proper length.

The machine is semi-automatic in operation, the shells being fed into the hopper by the operator and carried automatically to the foot of the hopper to a position directly in line with the chuck, where they are pushed into the chuck against a positive stop and the cutting operation performed. After this is done the shells are pushed out of the chuck and dropped through the bed. One of the special features of the machine is its adaptability to different sizes of shells, the hopper being adjustable, and to change from one size of shell to another only simple parts have to be made over. A short shell with a rounded bottom, which, it is pointed out, is apt to tip over in handling by the ordinary methods, is taken care of as it is held between the push-in and knock-out rods as it enters the chuck.

The machine is built with a three-step cone pulley for belt drive and for driving the spindle also, an arrangement which permits variation in speed for taking care of the different classes of shells. If desired the machine can be furnished with an elevator for lifting the shells after they are trimmed and dropping them into a steel shop barrel. A lubricating system for flooding the tool with oil when it is cutting can also be furnished.

The machine illustrated, which is one of the line built for handling this class of work, has a rated capacity for shells up to a maximum outside diameter of  $2\frac{5}{8}$  in. and  $1\frac{1}{2}$  in. long or 2 in. in diameter and 3 in. long, the maximum thickness of stock being  $\frac{1}{8}$  in. A recent test of the machine made in the builder's shop showed that 12 shells of  $\frac{1}{8}$ -in. material  $2\frac{5}{8}$  in. in diameter and  $1\frac{3}{8}$  in. in length were edged in 1 min., while 23 shells of  $1\frac{19}{32}$  in.



A Recently Developed Semi-Automatic Machine for Trimming the Slightly Ragged Edges of Drawn Steel Shells with a View of Typical Products

diameter and  $1\frac{1}{8}$  in. long with walls  $\frac{5}{64}$  in. thick were trimmed in the same time. The rate of production of the shells, of course, varies with the grade of material, the character of the cutting tool and the amount of stock to be removed.



# Handling the Depreciation Account

## The Common Carelessness in Providing Ready Funds for Replacement Even When Selling Price Covers a Depreciation Factor

BY G. D. CRAIN, JR.

In spite of the attention which is given nowadays by manufacturers and others to cost accounting, it is undoubtedly true that treatment of the element of depreciation is still illogical, to use no stronger term. The point is that while the fact of depreciation is realized and a charge is made for it, disposition is not always made of the funds resulting in such a way as to make the item of real value.

The situation can be made clear by the use of an illustration. Take a plant with a capital investment of \$500,000. Assume that it has been decided that annual depreciation of 10 per cent., or \$50,000, each year is a fair estimate of the loss of value, so that the entire plant will have been charged off in ten years. Assume also that the business handled each year is \$2,000,000, so that depreciation becomes a part of the overhead expense to the extent of 2½ per cent. In other words, if taxes, insurance, executive expenses, advertising, etc., amount to 10 per cent., the total overhead expense, including depreciation, is obviously 12½ per cent. The reason for emphasizing this fact is that in figuring the selling price the factor of overhead is of course included. A machine with a shop cost of \$500, carrying a profit of 10 per cent., would sell for approximately \$645, provided the overhead were 12½ per cent. In other words, the charge for depreciation reflected in the selling price of the goods is \$16.125.

### WHAT IS DONE WITH DEPRECIATION COLLECTIONS?

What becomes of this amount? That is the vital question, considered from the standpoint of taking care of the actual depreciation of the plant. What becomes of all of the separate items which during the course of the year aggregate \$50,000 and thus meet the charge which has been made for that purpose? In many plants, nothing whatever is done with the amount. That is, it is treated like any other part of the revenues, and after operating expenses have been paid, is considered as part of the profits, dividends on stock being paid with it without a thought of what actually is being done.

The lack of logic of this method will be realized when it is remembered that the 2½ per cent. charge for depreciation is in effect a tax on the community. In using it, the manufacturer is practically saying, "I am supplying my factory and equipment, my best personal efforts, my capital, in making and selling this product. In return I ask a fair remuneration for my efforts and likewise a sufficient amount to enable me to keep my plant in good condition, so that I shall not suffer the loss of my principal through depreciation."

Yet, if he takes the money which is derived through this charge, as suggested, and applies it to his profit account, or to anything else except the purpose for which it was created, he is putting himself in the attitude of a municipality which levies a tax for waterworks, for example, and uses the money to increase the salary of the mayor. The analogy is exact. It is no more a case of robbing Peter to pay Paul in one instance than in the other. The only difference is that the situation has not been clearly defined in the one instance, whereas

everybody recognizes the situation when it comes to municipal expenditures.

It might be explained, of course, that if the depreciation charge is not handled so as to make the amount derived from it available for the replacement of worn-out or obsolete equipment, the inventory at the end of the year shows the loss through depreciation, and the corporation, if the business is operated by a stock company, has the privilege of taking enough from its earnings to provide for this loss. It might also be argued that through current repairs and periodical overhauling of equipment, the plant is really kept up to its former standard, and that by providing the proper expenditures for maintenance, the company is in reality taking care of depreciation. The item of obsolescence, if no other, however, would prevent maintenance from taking the place of replacement, for in every plant there comes a time when machinery which is inefficient, judged by current standards, must make way for newer and more productive equipment.

But considering the depreciation fund apart from the technical accounting angle, it is worth noting that when money raised through a charge of this kind is spent, say, in dividend payments, the stockholders are receiving money to which they are not entitled. That is to say, dividends are supposed to be taken from the actual earnings of the business; the profits accruing from the manufacture and sale of the product of the factory. But money raised through a charge to take care of depreciation can certainly not be considered in this light. At best, the company is "breaking even," and to apply the revenues thus derived is to put the situation in an entirely false light.

### HOW REPLACEMENT FUNDS ARE COMMONLY RAISED

Such a practice makes it necessary to secure funds for replacing worn-out or inefficient machinery either by appropriations from current revenues, which will necessarily involve a shrinkage in the net profits for that period; or by capitalizing the expenditure, if the changes to be made are of a major caliber. Of course, if the machinery installed is in the nature of an improvement, it is proper to capitalize it through an issue of additional stock or bonds; but if it is merely a replacement, money for this purpose should come out of the fund which should have been provided by means of the depreciation charge.

To capitalize a replacement of old machinery, when the company, in theory at least, has been providing for depreciation and should be in a position to make the necessary changes without difficulty, is a subtle form of stock-watering, since the business must earn dividends on equipment which has been paid for twice over. If the same interests held the stock of the company continuously, no one could object; but there is no assurance that this is to be done.

### PROPER HANDLING OF DEPRECIATION FUNDS

The ideal plan is to apply the depreciation charge, and to place the funds derived from it in

a sinking fund. The money in this fund is invested in easily convertible securities, so that at all times there is available money for the purchase of new machinery to replace that which has become useless. When this is done, keeping the plant up-to-date is not a matter of difficulty, but is performed almost automatically; and instead of being a strain on the resources of the company, it is accomplished with ease, simply because the tax for depreciation has been used to take care of depreciation, and for no other purpose.

It is natural, of course, for the manager of a manufacturing plant to desire to "make a showing," and to pay as high a rate of dividends as possible. Consequently diverting money from the sinking fund for depreciation into the profits account may seem justifiable, but certainly it is not good business, in the long run. The purpose of a depreciation charge, and consequently a depreciation fund—for the use of one anticipates the creation of the other—is to distribute the wear and tear on the plant over the full term of its use; whereas disregard of the proper use of the funds thus provided is to insure the load falling all at once, and in the earnings for those years in which heavy replacements become necessary being unreasonably reduced.

There are large and successful concerns, operated as "close corporations," which make no charge for depreciation, but buy new machinery, including that which is in the nature of improvements as well as for replacement purposes, out of current revenues. With the interests centered in the hands of a few people, the method of handling this feature is of minor importance; but when the stock of the company is held by more than a few, it is extremely desirable, if not absolutely necessary, that proper disposition be made of the depreciation account.

### Duplex Cold Saw Cutting-Off Machine

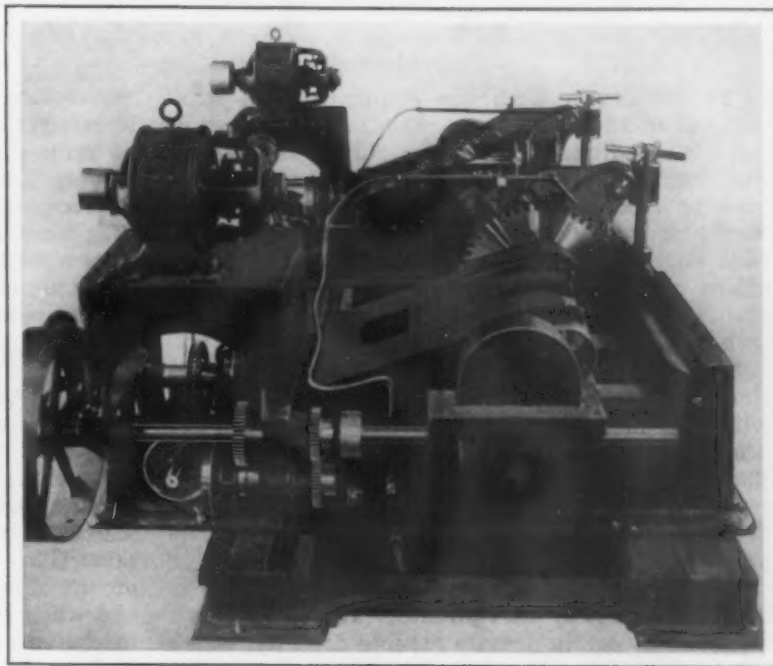
A rapid production duplex cold saw cutting-off machine for simultaneously sawing off both ends of an axle is being built by the Espen-Lucas Machine Works, Philadelphia, Pa. It is equipped with two special inserted tooth saw blades 32 in. in diameter and has a capacity for cutting off both ends of 12 to 15 9-in. axles in 1 hr.

The main bed and table are made of heavy castings tied together by heavy webs. The carriages for the saws are wide and long, with large bearings on the base. The saw carriage has an automatic power return and automatic starting device, which, it is emphasized, leave the operator free to give his whole attention to feeding the axles to the machine and removing them when finished.

The saw blades are bolted directly to the driving gears which are forged as an integral part of the spindle ends. This construction is relied upon to eliminate loss of motion between the saws and the gears and to give a bearing extending the entire width of the carriage for the spindles. The gears, spindles and shafts throughout the machine are cut and turned from high carbon hammered steel forgings and bronze bushings are used for all the bearings. Roller thrust bearings are employed to take

up the thrust of the driving worm and other parts revolving at a high rate of speed.

Feed and speed variations are provided which will enable the machine to saw off material at an advance of 6 in. per min. It is pointed out that the cutting capacity of the machine is limited only by the nature of the steel that is being cut and the



A Rapid Production Duplex Cold Saw Cutting-off Machine Designed for the Simultaneous Sawing of Both Ends of an Axle

endurance of the high speed steel used in the cutters in the saw blades. The feed is obtained from a geared friction plate controlled by an automatic lock nut lever, which enables any change in the cutting speed to be made while the machine is in operation. It is also controlled by an automatic stop which regulates the depth of the cut up to the full capacity of the machine. The blades are driven independently by 15-hp. electric motors and the weight of the machine is approximately 30,000 lb.

In addition to this duplex machine a heavy type rapid production machine designed for sawing round and square bars up to a maximum dimension of 20 in. has also been brought out. The general construction of this latter machine is practically the same as one-half of the axle cutting-off machine. A saw blade 60 in. in diameter is used and a 35-hp. motor is employed for driving. Compressed air or screw clamps are furnished with this machine, depending upon the requirements of the user. Where multiple cuts are to be made and it is desired to handle the stock rapidly a stock feed attachment, which will handle bars of any length up to 20 ft., is supplied. The weight of this machine is approximately 50,000 lb.

"Dry Rot in Factory Timbers" has been made the subject of a pamphlet of 34 pages printed for general distribution by the Inspection Department, Associated Factory Mutual Fire Insurance Companies, 31 Milk street, Boston, Mass. It contains the results of investigations carried on the past three years in mills insured by the company. It appears that in this time more than \$100,000 has been spent to repair damage due to dry rot in cases which came to the attention of the department, and in nearly all these the lumber affected was Southern hard pine in comparatively new buildings. The booklet contains numerous photographic reproductions showing fungus growths and is replete with suggestions to prevent decay.



# Maintenance of Machinery in the Industries

## What a Niggardly Policy Means—The Sum Total of Equipment for Keeping Factories, Public Works and Shops in Operation Not Appreciated

—BY C. A. TUPPER—

In connection with the equipment and management of shops or departments devoted to repair work, a condition often lost sight of is the fact that any time saved by increased efficiency of tools or labor does not mean merely economy of wages or greater output per man and tool; but each day gained in the repairing of a machine means an added day in the earning capacity of that machine. The net profit, therefore, from each and every improvement in equipment or system for making repairs to one's own machines should be figured by the lessened time required to put those machines in condition for service. The poorest place for a niggardly policy, either in respect to investment or operating expenses, is in the repair department; yet in periods of business depression or other unfavorable circumstances it is usually one of the first to suffer.

One of the most striking examples of this is in the operation of the railroads. There the rolling stock has a certain definite earning capacity, which can be figured out very closely for each locomotive or car; and for every day one is out of service for avoidable causes the road loses just so many dollars that might have been earned. Particularly is that true of the motive power, which has always been the weakest link in nearly every railroad system. When an abnormal number of locomotives are out of service or inefficient and there is an abundance of freight offering, the resulting demoralization of traffic costs both carriers and shippers enormous sums of money. And that is what happens, time after time.

### RAILROAD EQUIPMENT OVERHAULING AT WRONG TIME

In illustration the writer will cite the case of a railroad in the Central West with whose operation he happened to be especially familiar. The shops of this road, which were so extensive in their equipment that complete locomotives and cars could be turned out in quantities when prompt deliveries from regular builders were not obtainable, had always been maintained on a high plane of efficiency. Some of the tools, however, were beginning to wear out and there was need of additional or more modern equipment in certain departments, so that extensive improvements had been decided upon, when suddenly the directors took adverse action on the whole proposition. Alarmed by the beginning of the conditions concerning which railroad companies have lately been complaining so bitterly, they determined upon a policy of retrenchment. The orders for new pattern making, foundry, machine, boiler and tank shop equipment, etc., with a much needed addition to the power plant and a line of electric motors, were cancelled. The force in the shops was reduced and purchases of supplies curtailed.

For some time the only effect apparent was a saving; while the cleaning up of the storage yards and the utilization of much material that had previously been ordered scrapped made a showing for the new dispensation which was apparently very gratifying. At the same time, however, the

movement of traffic continued heavy and every locomotive was needed for it that could possibly be pressed into service. Hence constant causes of trouble began to arise between the operating and motive power departments. The former complained that locomotives sent in for overhauling and repairs were unduly delayed in the shops, and the latter retorted that it was doing the best it could with the crippling of its facilities and the reduced force.

### BREAKDOWN OF MACHINES NOT EARLIER REPAIRED

Expensive overtime operation was resorted to, but with no great advantage. Then the inevitable happened; the work was skimped. In response to hurry-up calls from the operating department, locomotives and cars were hastily repaired or fixed up, and sent out again as soon as possible. At the same time each division kept its rolling stock out of the shops until serious breakdowns occurred; and when the locomotives did come in they needed extensive repairs in place of the customary overhauling and remedying of minor defects. This was only accentuated by the tinkering to which they had been subjected at the division roundhouses in the effort to keep them going. As to freight cars, these were often in such shape that a far greater percentage than usual had to be put permanently out of commission.

Meanwhile the situation in the shops themselves got to be worse and worse. Being crowded with the work from outside, the men had little time to give to the care of their own machines, and the old tools which were to have been replaced began to break down, one after another, with consequent delays while they were being repaired. This, again, was reflected in the service rendered the operating department.

To cap the climax, severe weather conditions and heavy falls of snow set in; and, with its crippled motive power, the company found traffic getting more and more congested and delayed, with the result that practically all competitive business went to other lines better situated to take care of it.

Finally conditions in the motive power department became so pitiable that the directors of the road were forced to take action to improve them. The shops were put back full force and time and some of the needed improvements carried out. But the road has not yet recovered from the niggardly policy that had been inaugurated and its prestige among shippers appears to have been permanently impaired.

Another road which nearly parallels the system referred to, with numerous feeders traversing the same territory, observed the predicament of its neighbor and analyzed the cause, as brought out in a conversation which the writer had with one of the former's traffic officials. Instead, therefore, of attempting retrenchment in the motive power department, it kept the shops up to a high standard of efficiency and was a steady buyer of equipment and supplies, as needed, during all the period when its competitor was retrograding. A project for entirely new shops, with the most modern



equipment, was also inaugurated and has been partly carried out. The result has been efficient handling of traffic and a steady growth in business, particularly from competitive points.

#### IRON MINES NEED TO CARE FOR REPAIR SHOPS

What is true of railroad repair shops can be carried into many other lines of industry. Mining companies, for example, are awakening to the importance of not only repair but maintenance work, and are providing facilities equal, in many cases, to those of high-grade forge and machine shops. This applies particularly to the mines on the iron ranges, both for open-pit and underground operation, where any interruption or hampering of operations may mean serious loss, especially if occurring toward the close of the shipping season. The care of the drills is an important item, and good facilities must be provided for the proper heat treatment and shaping of the steel, sharpening, etc. For deep mining the growing use of motors, both under and above ground, makes additional demands, so that a small but complete electric repair department becomes a desirable adjunct to the main shop. A welding outfit is also needed.

When ore-concentrating plants, smelters and refineries are operated, either in connection with mines or independently, the function of repair plants becomes much more complex. Some of those started a number of years ago, as at Calumet or Anaconda, have become so large that now they not only keep in order but also build much of the equipment used. This, to the writer's mind, is a doubtful economy; but for out-of-the-way districts it has the decided advantage of keeping a good force of men steadily employed, as it is difficult to get these back once they have drifted away.

Analagous to mining machinery repairs and also to railroad work is the maintenance of machinery for large construction projects, such as the erection of furnaces and mills or other large industrial plants, the building of a dam, heavy excavation, bridge, dock and power plant construction, etc. In all such undertakings, where bonuses for prompt execution and penalties for failures to complete work within contract periods have come to be the rule, delays are costly. Hence an effort is made to avoid any absolute break-downs, to supply necessary repairs or replacements as speedily as practicable and to keep all of the equipment up to a high standard of working efficiency. For all such maintenance work a well-equipped field shop has to be installed; and neglect of any essential detail is one of the most serious mistakes that a contractor can make.

The old saying, however, of a stitch in time represents the thought most prominently kept in mind in the conduct of manufacturing operations involving large production. To take textile mills as an illustration, it may be pointed out that the remarkable records made at numerous establishments within the past few years have only been possible as a result of the almost perfect condition in which the machinery has been kept. For this the credit belongs to a thorough system of inspection and to the prompt utilization of the repair shop for everything not to be remedied in place.

#### TOTAL PURCHASES FOR REPAIR PLANTS LARGE

Anyone who has not traveled about a good deal and made a special study of the subject would be surprised to know what an enormous number of shop tools and quantity of metal-working supplies are purchased for these repair plants, and how many smiths, machinists and other skilled mechanics are

employed by them. A large percentage of the mechanical engineers of the country are also identified with the industries, and the repair plants naturally come under the direction of certain of these engineers, which insures keeping them up-to-date. Publications devoted to metal-working, particularly when giving quotations on material, are taken as a matter of course; and it has been the writer's observation that the information contained in these papers is intelligently applied—more so, in fact, than by those of us who have been identified with the metal industries proper.

For concerns directly engaged in any branch of metal-working, the matter of repairs to the machinery in the plant itself is one which, outside of the operations in the tool room, has not ordinarily been given much attention apart from other work. Ample facilities for maintenance of the machinery are usually available, and whether it would pay to departmentize that branch of the work is a question that could not be decided except from a study of the local conditions. This article is not concerned with it. It would seem, however, as though some regular machine shops might find profitable suggestions in the smaller plants operated for repair work only, which they are furnishing with tools or supplies.

In conclusion the writer wishes to call attention to the notably good example which has been set by iron and steel producers in maintaining well-equipped repair plants. Their business, of and by itself, usually has no more to do with the operation of machine shops than that of a cotton mill or ocean going vessels; yet there can scarcely be found a modern furnace plant or mills where first-class shops are not included. That they find these of great value as an aid to the smooth, efficient operation of their works goes without saying, and it is also worthy of note that the purchase of the equipment and supplies constantly needed for such shops is a strong element of support to the machine tool industry.

From the foregoing it will be seen that the subject of repair plants is one of considerable economic importance; and anyone entrusted with the maintenance of machinery who has not given to the first fact brought out in this article the attention which it deserves will do well to think it over. Perhaps the improvement of his own repair plant which he has been holding back with a view to "economy" will seem less a matter of expense than necessity.

#### Lackawanna Steel Company's Year

The income account of the Lackawanna Steel Company and its subsidiaries for the year ended December 31, 1913, compared with the previous year, is given as follows:

	1913	1912
Income from manufacturing and operating, after deducting all expenses incident thereto, including ordinary repairs and maintenance of plants and interest on bonds and fixed charges of subsidiary companies...	\$5,418,499	\$3,728,783
Income from investments, etc.....	749,345	743,769
Total income .....	\$6,167,845	\$4,472,552
Interest on Lackawanna Steel bonds..	1,749,753	1,749,958
Balance .....	\$4,418,091	\$2,722,594
Deduct sinking funds, exhaustion of minerals, etc. ....	452,188	577,833
Depreciation and renewals.....	1,210,020	1,135,949
Surplus .....	\$2,755,883	\$1,008,811
Special profit on sale of capital assets of subsidiaries .....	267,201	.....
Year's surplus .....	\$3,023,084	\$1,008,811

Unfilled orders December 31, 1913, were 185,427 gross tons, against 626,996 tons at the close of the previous year.

## JOSEPH SELLWOOD

### An Outstanding Figure in Lake Superior Iron Mining

Joseph Sellwood, whose name will always be associated with the marvelous iron ore development of the Lake Superior region, died at his home in Duluth, Minn., February 24, aged 68 years. He had been in ill health for some time. Of late years Captain Sellwood had devoted most of his attention to banking. At the time of his death he was president of the City National Bank of Duluth, which he had founded, and also connected with other banking institutions.

No history of iron mining in the United States could fail to take account of Captain Sellwood's rise from boy mine worker to the place of a great, constructive figure in the work of making available the country's greatest store of iron ore. Born of poor parents, he was obliged at the age of 13 to enter the tin mines of his native Cornwall, England. At 19 years he came to this country and found employment for a short time in the iron mines of Mount Hope, N. J. From 1865 to 1870 he was employed at copper mines in Ontonagon county, Michigan, but from the latter year he was identified with the mining of iron ore. In this field his first work was as an ordinary miner for the old New York Mining Company, then operating on the Marquette range. He then undertook contracts for taking out ore, first in a small way and finally to the extent of handling the entire output of mines. Properties which he worked under contract included the New York and Cleveland mines, the latter now operated by the Cleveland Cliffs Iron Company.

In 1885 Mather, Morse & Co. (Samuel Mather, Jay C. Morse and James Pickands) sent Mr. Sellwood to open the Colby mine, the first mine on the Gogebic range. In the same year he opened the Brotherton mine for Pickands, Mather & Co. Later he organized the Brotherton Mining Company, of which he became vice-president, holding one-fourth interest, which he retained until the sale to the Lackawanna Steel Company, the buyer at the same time of the Sunday Lake mine which had been under lease to Captain Sellwood. In 1888 he went to Duluth and opened up the Chandler mines at Ely on the Vermillion range. Four years later he had charge of exploration for the Minnesota Iron Company, of which he was made vice-president. He was closely identified with the development of the Menominee, Mesaba and Baraboo iron districts.

From 1898 to 1902 Captain Sellwood was in charge of all mines of the American Steel & Wire Company in the Lake Superior district. For this company he opened the Sauntry, Alpena, Clark and Chisholm mines on the Mesaba range, the Atlantic on the Gogebic range, the Moore on the Marquette range and the Cuff mine on the Menominee. When the United States Steel Corporation was formed

he left the American Steel & Wire Company and turned his attention to acquiring title to Mesaba range properties for himself and the independent interests with which he was associated, including Pickands, Mather & Co., the Cherry Valley Iron Company, the Wheeling Steel & Iron Company, the Central Iron & Steel Company and the Salem Iron Company. He obtained control of many valuable iron ore properties, several of which were later taken over by various iron and steel interests. At a later date Captain Sellwood took charge of the mines of the International Harvester Company, although not relinquishing his other interests, a fact which illustrated his great capacity for work. In a characteristic way he gave personal attention to his business affairs regardless of physical discomforts. At one time or another, he was interested in 12 mines, a steamship company and other enterprises. He was vice-president of the Duluth & Iron Range Railroad Company until 1898 and a heavy investor in the ore-carrying trade. Captain Sellwood was a member of the Chicago Club, Chicago. He was twice married and leaves a widow and three children, two daughters and a son, Richard M. Sellwood, who was trained in mining by his father and looks after those interests. He also leaves an adopted son, Joseph Sellwood.



JOSEPH SELLWOOD

Plans are practically completed for the celebration of the 50th anniversary of the School of Mines, Columbia University, which begins on May 28 with a reception in the gymnasium. At that time the alumni will be welcomed by the president of the university, the dean of the School of Mines, the senior professor, Henry S. Munroe, the chairman of the celebration committee, and others. On May 29 there will be a meeting at which President Butler will preside, and degrees will be given to prominent alumni of the School of Mines. There will also be sectional meetings of the various engineering graduates. The celebration will close with a banquet at the Waldorf-Astoria, with addresses by prominent alumni and others.

Astoria, with addresses by prominent alumni and others.

Four treatises on transportation topics have been published by LaSalle Extension University, Chicago, as follows: "Freight Rates: Official Classification Territory and Eastern Canada," by C. C. McCain, chairman Trunk Line Association, and W. A. Shelton, A.M.; "Bases for Freight Charges," by C. L. Lingo, traffic manager of the Inland Steel Company; "The Industrial Traffic Department," by W. N. Agnew, traffic manager of the International Steam Pump Company; "Statistics of Freight Traffic," by Julius H. Parmelee, Ph.D., statistician, Bureau of Railway Economics.

The Winnipeg Electric Railway Company has engaged the J. G. White Engineering Corporation, New York, to make surveys, designs and estimates for a hydroelectric development near Winnipeg, Canada. It is stated on good authority that the ultimate development of the properties may be considerably in excess of 100,000 hp., but plans are to be prepared now for 40,000 hp. The president of the Winnipeg Company is Sir William Mackenzie, of the Canadian Northern Railroad.



## SINTERED IRON ORES COMPARED

### Experience with Two Important Processes and Data as to Costs

In a paper printed in a recent issue of the Proceedings of the Engineers' Society of Western Pennsylvania, B. G. Klugh, of the American Ore Reclamation Company, New York, discusses "Sintering Processes for Iron Bearing Materials." This paper was read at a meeting of the society. It is principally a description of the Dwight & Lloyd process, with data on more recent results. Among other things Mr. Klugh says:

The efficiency of this process as a desulphuring agency, has in its recent commercial developments surpassed tests on smaller lots. Pyrites cinder with sulphur ranging from 2.0 to 6.5 per cent. has been treated with a product below 0.10 per cent. sulphur without variation. In fact as a result of satisfactory tests, a company is preparing to operate, selling its product on a guarantee of sulphur below 0.10.

Several thousand tons of an Eastern magnetite, which contains sulphur varying from 1.5 to 4.0 per cent., and was equally objectionable on account of its silica and lime content varying interchangeably 6 per cent. either way, have been sintered. The sulphur was eliminated uniformly below 0.15 per cent. It was below 0.1 when the crushing was below  $\frac{1}{4}$  in. in size. This ore had been used in the past, in its raw state, always with bad results. Its use meant scaffolds, slip, scurrying, even when small quantities were used. The operators had about concluded that some element or combination of elements, existed in the ore which made its use in the furnace prohibitive. The variation in the fluxing elements was doubtless the cause of the trouble. This is borne out since the 2000 tons which were sintered were used in the furnace. The results were so satisfactory, that the mine which was closed several years since, for the above reasons, will be immediately reopened.

The cost of operating a plant of two units, is here-with given for a typical case. Publicity of exact figures will not be proper courtesy to operating companies, nor would be the name of the operating company attaining them. However, the round figures here given have been attained within 10 per cent.

Producing labor .....	\$0.18
Ignition .....	.06
Repairs .....	.06
Power (8.8 kw.-hr. per ton) .....	.16
	.46

In the Pittsburgh district, with its cheap natural gas, the ignition cost will be only a fraction of a cent. Where power is made at a blast furnace, or steel plant, and used by the same company, the power cost will be much lower than the above given. The labor above consists of one foreman, one machine operator each turn, one oiler (day turn only), and three laborers day turn and two night turn.

The discussion at the meeting, which was extended, was participated in by several interested engineers and metallurgists. N. V. Hansell, 50 Church street, New York, said:

J. E. Greenawalt, who was experimenting with such sulphide ores, made commercial use of the down-draft principle as early as 1905, and credit is undoubtedly due him for having demonstrated that it is practically and commercially feasible to roast and sinter fine ores by the combustion of sulphur, or other heat-producing substances, supporting the combustion by induced draft. It was Greenawalt, also, who introduced the use of the so-called "porous bed" on the top of the grates in order to protect them and incidentally to maintain the particles to be sintered in a quiescent state.

While thus Greenawalt has to be recognized as a pioneer in connection with down-draft blast roasting, a pioneer who combined with his ingenuity an admirable perseverance in working out the details of his exceedingly simple but efficient intermittent method, it

must be admitted that the continuous principle with its many apparent advantages is a Dwight & Lloyd feature.

A little later in his paper, Mr. Klugh speaks about one Dwight-Lloyd unit having a daily capacity of over 150 tons for several months of operation. This is exceedingly satisfactory and undoubtedly indicates that the mixture being sintered is in good condition physically and chemically. The percentage of fuel in the mixture, or percentage of coke, when treating flue dust, is a factor of paramount importance. Also, the granulation of the ore has to be just right. If the ore is too coarse, the charge will lose its heat and the sintering action may stop entirely; if the ore is too fine, the resistance against the passage of air through the bed may be so high as to considerably increase the sintering time.

In talking about the use of a layer of lime stone directly on the grates, it is only fair to again repeat that this feature was originated by Greenawalt and enters as an important claim in the specifications of his early patents. Dwight & Lloyd are using this idea in connection with the continuous process under license from Greenawalt. The honor for making down-draft blast roasting an important step in connection with the use of flue dust and other fine iron bearing materials is due Greenawalt as well as Dwight & Lloyd.

Greenawalt has now got his method in commercial use on iron bearing materials in six plants in this country and two plants abroad (Italy). In addition, there are two plants under erection in the United States, one in Canada and three in Europe and Asia.

In reply to Mr. Hansell, Mr. Klugh in a written discussion submitted later said:

It seems best not to attempt to reply to Mr. Hansell's statement of the claims of the Greenawalt process, not only because a controversy over questions of patent infringements and priorities seems hardly in keeping with the purpose of this paper, but also because many of the matters in dispute are now being adjudicated through interference proceedings in the Patent Office, and undoubtedly will later be tested in the Courts. Meantime it is sufficient to say that according to my understanding, Dwight & Lloyd have never maintained that they were the first to use the "down-draft" for metallurgical purposes, or even in connection with the roasting of ores, but they do claim that they were the first to show how this agency could be used for the specific purpose of successfully and completely sintering a thin layer of fine ore, and do it deliberately and unfailingly, in contradistinction to the haphazard, unintentional and usually unwished-for production of irregular masses of sinter with no definite or regular structure which had previously characterized efforts along this line. Besides the questions at issue concerning the down-draft, etc., there are others involved which are quite as pertinent. Mr. Hansell will pardon me, I hope, for not going into the matter further.

Dr. K. F. Stahl, superintendent General Chemical Company of Pennsylvania, Pittsburgh, said:

Practically all the processes in which the material is subject to a high heat are being tried. Nodulizing furnaces make a desirable material for a blast furnace at a cost of about \$1 to \$1.25 per ton. Iron contents depend on the grade of pyrites used, usually about 60 per cent. iron. Phosphorus contents compare favorably with the best low phosphorus Lake Superior ore, i. e., 0.01 to 0.02 per cent.; sulphur is usually brought down to 0.1 per cent. Powdered coal (10 to 12 per cent.) is mostly used for fuel. Mr. Klugh stated that the cost of sintering in a Dwight & Lloyd furnace was less than 50c., exclusive of royalty, which would make it the cheapest process known at present.

Regarding the question of the effect of weathering, Mr. Klugh reported:

The only instance we have of the weathering of Dwight & Lloyd sinter is that of a case at Birdsboro, where, due to the furnace being out of blast, several thousand tons were stocked for a period of about eight



months. This period covered March, 1912, to January, 1913, hence included freezing and other weathering conditions. The structure was practically unchanged. There was no disintegration whatever.

The chairman, John S. Unger, manager Central Research Laboratory, Carnegie Steel Company, Duquesne, Pa., asked what provision was made for the variation in a pile of stock flue dust which has been made up of shipments from a number of furnaces, the carbon varying from 5 to 30 per cent. in the same pile. Mr. Klugh replied to this by saying:

"The easiest method of handling the variable stock-pile flue dust is by concentration. The next easier solution for the sintering operation is by dilution of the carbon with the fine ores which will, under usual conditions, make flue dust. On the other hand the flexibility of the process allows the use of the raw flue dust as such."

### Milliken Brothers, Inc.

The first annual report of the recently reorganized Milliken Brothers, Inc., New York, has been issued. In submitting the balance sheet of the company, as of December 31, 1913, Francis Dykes, vice-president and general manager in charge of operations, states that inasmuch as the company operated for only a few days in 1913 no statement of the results of its operations has been prepared. After alluding to the difficulties which the old company encountered in 1913, Mr. Dykes says:

"Generally speaking, the company's field of operation is limited to territories where it lies under no substantial freight disabilities, but notwithstanding this during the past year work was secured for shipment to 18 different States and also to 6 foreign countries. There is, I am satisfied, ample scope to our territory for the securing of structural steel work substantially to the capacity of our plant. It may be noted that in the past year the old company erected the steel frame work for the largest and most complicated office building structure erected in the city of New York that year.

"In respect to transmission development during 1913, there were constructed about 1000 miles of tower transmission lines, of which the old company furnished the steel work for approximately 800 miles. It should be borne in mind, however, that the business secured from transmission development is decidedly intermittent. Some years there is a fair volume, other years a very small and limited requirement.

"The output of the shops during 1913 was 34,389 tons. The buildings and equipment of the open-hearth steel plant and rolling mills, with the exception of such buildings and equipment as are considered of special value to the fabricating plant, have been sold for dismantling and removal. With the buildings and equipment retained, and a nominal expenditure, the fabricating plant will have an annual capacity of over 100,000 tons. There is no necessity to dispose of any part of the company's surplus real estate holdings at present (such surplus consisting of about 140 acres situate at Staten Island and in New Jersey), it being the intention to retain this land until such time as real inducements are offered to sell.

"Because of the restrictions imposed upon the receivers and the trustees during the time which they operated the business, and especially so in the matter of the taking of contracts, the shops when acquired by this company had little or no work on hand. This, emphasized by the scarcity of work in the market and the abnormally low prices prevailing, has worked a hardship on the company,

which together with the cost attendant to the reorganization and rehabilitation of the business will naturally be reflected in the earnings for 1914. Trade conditions, however, are apparently gradually improving."

The assets of the reorganized company include land with a valuation of \$484,000 and plant and equipment valued at \$645,000. The investment in uncompleted contracts, less amount billed, is \$79,682.33, while materials and supplies represent \$96,680.89. Accounts receivable from various sources total \$590,822.05, and the company has in bank \$501,181.32 and working funds of \$4675, making a total of \$1,273,041.59. Total assets are given as \$4,808,935.98, this figure including discount on securities issued. Current liabilities are given as \$241,991.77, and inventory and work in progress reserve are placed at \$35,427.54. The plan of reorganization provided for common stock to the value of \$3,000,000 and 10 year 6 per cent. gold notes due December 1, 1927, amounting to \$750,000.

### The Baldwin Locomotive Works

The third annual report of the Baldwin Locomotive Works, Philadelphia, covering operations of the fiscal year ended December 31, 1913, has been issued. The gross sales are reported at \$37,630,969.21, against \$28,924,335.16 in the preceding year. Other income, including dividends of the Standard Steel Works Company, amounted to \$787,163.74. The expenditures for real estate, buildings and machinery for the year aggregated \$200,449.25, there having been charged against the operations of the year for maintenance and renewals \$970,426.08. The net profit of the year was \$4,017,800.33, against \$3,698,571.44 in 1912. The surplus as of January 1, 1914, after the payment of dividends, was \$4,887,791.09. The surplus shown by the consolidated balance sheet of the Baldwin Locomotive Works and the Standard Steel Works Company is \$5,530,159.60.

President Alba B. Johnson states that the total sales of the Standard Steel Works Company for the year 1913 were \$6,821,594.07 and the net profits \$745,652.45. Out of these profits there have been purchased for the sinking fund \$200,000 of bonds which have been canceled and dividends have been paid of \$525,000, leaving a surplus for the year of \$20,652.45 and an accumulated surplus of \$483,869.82. Of the \$5,000,000 Standard Steel Works Company bonds originally issued, \$1,200,000 have been canceled for the provisions of the sinking fund, leaving the amount outstanding \$3,800,000. In the year the foundations have been constructed for the proposed shops at East Chicago. In conclusion Mr. Johnson says that in the early part of 1913 orders were received sufficient to provide a satisfactory volume of work through the first nine months of the year, but there was a considerable recession of business in the last three months. He believes that while the value of orders carried into 1914 is relatively small there appear to be prospects of early improvement.

### The Testing of Molding Sands

A special course in the testing of molding sands at the Wentworth Institute, Boston, is outlined in a paper presented to the American Foundrymen's Association by Edwin A. Johnson. Fifteen distinct considerations are pointed out in connection with the selection and treatment of molding sands, and it is maintained that the percentages of failures in many cases can be greatly reduced and that in consequence large economies can be made by having accurate knowledge of the exact properties of the different sands; the degree of ramming that each sand requires for a given type of work, the amount of venting it needs, its ability to withstand scouring, fusion and scabbing; the amount of facing that it will safely carry, the amount of gas it gives off, and the quantity of water that it requires as compared with other sands, to give the best temper for different kinds of work.

## DELAY IN BUSINESS MAIL

### Insufficient Addresses Cause Much of It at the Chicago Post Office

Mail deliveries in the larger cities are increasingly a problem. The situation at Chicago particularly has been a matter of complaint. There is little doubt that the post office in that city is attempting too much for its facilities, but it is also true that a part of the trouble is due to carelessness on the part of senders of mail. The instances are of daily occurrence where the efficiency of high salaried employees is seriously cut down by the carelessness of an addressing clerk. This phase of the situation was dealt with in an interview a representative of this paper had with the post office authorities at Chicago, in which substantially the following statement of their position was given:

By insidious degrees a practice has developed in line with the rush in general business, to shorten in every possible way the process of correspondence. One of the most obvious things to save time seems to be to eliminate the address, or save money by eliminating a line in an advertisement or a letter head. This is entirely fallacious. All mail not definitely and accurately addressed is subject to some delay. It is not the business of the post office to address mail, but to deliver it to the party addressed.

Seventy-eight mail trains arrive in Chicago daily. Of these 34 arrive between the hours of 6 a. m. and 9 a. m., 18 between 9 a. m. and 4 p. m., and 26 from 4 p. m. until 6 a. m. the day following. The Chicago office receives daily about 2,075,000 pieces of first class mail for distribution and delivery, from outside sources. Between 6 and 9 a. m. a trifle over 65 per cent. of the mail received in the period of possible delivery comes in, and 43 1/3 per cent. of the first class mail received during the 24 hours.

At the main office there are 434 letter distributors. These distributors learn a group of streets with arbitrarily fixed numbers. Chicago has introduced in the last few years a complete renumbering system, and within the last year some hundreds of streets have been changed in name, which involves the forgetting of the old and the learning of the entire new scheme. There are some 46 carrier stations in Chicago, and before the mail can be distributed to any one of these stations it is necessary that the distributor shall know the street numbers bordering that station on all four sides. In addition to this there are 475,000 people who annually file with the postmaster changes of address. All mail coming for these addresses must be sent to its original destination, passing through the hands of all the clerks to the carrier with whom the removal is filed, and by him marked up and returned to the mails, then pass through all the channels to the carrier at the new place.

This means the rehandling of a large part of the mail for this great number of people, and represents the legitimate changes of address which are unavoidable. It would seem of itself to be a sufficient burden upon the efficiency of any great institution such as the postoffice. But the evil has been growing year by year until at the present time nearly one-half of the first class mail received at the main office is either insufficiently or improperly addressed.

#### INSUFFICIENT ADDRESSES HAMPER THE SERVICE

Much of the mail intended for Chicago is handled by the Railway Mail Service en route. That mail which is addressed to definite street and num-

ber is thrown to a section of the downtown district or to a station, while all mail addressed to street corners and without street number, is simply thrown as "No street number, Chicago." Mail which bears street and number is made up in bundles to the district to which it goes and upon arriving in the work room requires simply to be distributed to the carrier for delivery. The mail addressed to street corners, in many cases buildings, and with no street address is put into the hands of special distributors who have memorized some 6000 independent items concerning the location of prominent firms, banks, buildings, railroads, etc. If these men do not know the addressee the mail then goes to the directory section and is run in the directory. All this imposes a great labor upon the postoffice, delays not only the mail which itself is not properly addressed, but actually delays all the rest.

Even after the mail is distributed to a building in the loop district, there is a delay, for there are in all of the larger buildings several carriers, the average being from four to seven men. When the mail reaches the district it has to be handed from one carrier to the other, all of which delays the carriers departing from the office, brings them later upon their districts and means delay to all of the mail for the particular building. And when the regular carrier is absent the substitute, given unaddressed mail—that is, mail upon which the room number does not appear—is practically helpless. He must grope his way through the building by making inquiry and reading the signs.

The Chicago office is giving directory service, in round numbers, to some 8,000,000 pieces of mail a year. This represents an expense of some \$75,000. There are received for delivery 757,412,906 pieces of first class mail. The 8,000,000 pieces represent only a portion of the unaddressed mail, because much of the unaddressed comes to be known to the distributors by reason of the same people being chronic offenders. So a very small proportion of it, in fact, reaches the directory section, although all of it is delayed.

#### DEFECTS IN BUSINESS STATIONERY

One of the principal causes of the failure to use addresses is that the stationery of the Chicago houses does not show the address conspicuously displayed. It is either upon the letterhead in some obscure place, involved with other matter, or omitted entirely. Individuals and firms in small cities where every one is known do not realize that there are 25,000 firms within the loop district alone in Chicago, and they expect the postoffice will know any one doing business in the downtown district. Finding that a piece of mail sent without address is delivered, the sender thereafter takes no particular pains to use an address, having accomplished his purpose without it; and so the evil grows until it has reached such proportions that it seriously affects the integrity of the service.

In a word, the postoffice has no knowledge of the intention of the sender other than that expressed by him on the wrapper of the mail, and it is the business of the postoffice to deliver a piece of mail, in consideration of the sum paid, to the person addressed at the place addressed; and where the address is omitted, the sender has not complied with his part of the contract and the postoffice is not responsible for delay or mistreatment of the mail, the former of which is inevitable and the latter possible.

It seems singular that business men, possessed of the keenest sagacity, should neutralize the efforts of the postoffice by volunteering a handicap to efficiency.



# Six Years with Bonus Wage Payments

## An Argument for the Differential Bonus Piece Work System—Results Obtained—Separate Pay Days for Bonus Earnings

BY W. L. MYLES

The question is often asked, Does the bonus plan of work benefit the employee who performs the task? After six years of experience with this system and by close observation of its methods the writer can safely say without fear of successful contradiction that it does, and to substantiate this statement will cite some instances.

Why has it become necessary to change methods of pay and work from the old day's work system of pay to bonus or any other scientific system of work which offers a reward in form of extra compensation for greater efforts put forth? First, because competition is so keen that the manufacturer must reduce the cost of production to meet this competition successfully and keep his men engaged. Second, because labor demands its just share of the profits from that which it produces.

Under the old methods of pay about 90 per cent. of the workers give their employers on an average about 60 per cent. of their capabilities, which means that 40 per cent. is wasted in some way or other. This condition is plainly noticeable to a practical eye in most any shop where modern methods are not in force. In trying to reclaim this 40 per cent. of lost efficiency, many so-called scientific systems of wage payment have been devised; a few have met with some success, a great many have proved to be total failures due practically to "over-efficient" methods.

### ADVANTAGES OF THE SYSTEM

The system that seems to meet the demands of the employer most successfully and to benefit the working man most satisfactorily is the differential bonus piece work system of pay with a guarantee wage, because its basic principles are individual efforts with individual rewards or equal pay for equal work. Under this system the man is paid for what he accomplishes, not for the time he spends

out and the price per piece is justly determined, he is given a square deal in being allowed to accomplish as great an amount of work as he can with the assurance that his reward will be readily paid him. He also feels safe and willing to go ahead on the task set for him, because he has the company's guarantee that he will receive his regular day's wage in case of his failure to accomplish the task in the time allowed. It is in this particular instance where straight piece work falls down in that it provides no compensations for the man's efforts in case of failure to come up to the time allowed.

One of the great advantages that this system of pay has over straight piece work is that there are no cuts in the time or rate allowed per piece; a time once determined becomes standard. Because of this the man's attention is always concentrated on his work and not distracted, as it surely must be in the straight piece work system where continual cutting of the time and rate is practiced so freely.

It also benefits the working man because of the chance afforded of individuality; he does not have to divide the spoils with some fellow worker who may have not put forth the same amount of energy in the accomplishment of the task but received the full reward nevertheless. It benefits the working man by reducing to a large degree the physical effort formerly put forth in his work, for under this system the mechanic is instructed as to the best methods of performing his work; and by following the instructions given him, he soon realizes that by the cooperation of his brain and hands less physical effort is required. In a shop where this system is in force the men are doing 40 per cent. more work, with about 25 per cent. less physical effort. This is possible because this system automatically forces the brains of the management to cooperate with the efforts of the men in the shop,

Comparison Table of Results Obtained Under the Old and New Systems of Pay

Operation	Day Work Plan		Bonus plan		Advantage of bonus plan			
	Time taken per piece, hr.	Mechanic's hourly rate, cents	Time taken per piece, hr.	Mechanic's hourly rate, cents	Increase in rate per hour, cents	Percentage of increase in wage	Percentage of decrease in cost	Increase in efficiency, per cent.
Radial drill job.....	2/3	23	1/4	30	7	30	47	62
Milling machine job.....	45	35	16	43	8	25	56	64 1/2
Drill press job No. 1.....	20	23	14	28	5	22	15	30
Drill press job No. 2.....	3 1/2	25	1 1/2	32	7	28	45	57
Drill press job No. 3.....	15	28	8	37	9	32	30	47
Boring mill job.....	30	32	16	42	10	31	30	47
Lathe job No. 1.....	3	34	1	44	10	30	57	66 2/3
Lathe job No. 2.....	2	34	1	45	11	32	84	50
Planer job.....	23	33	13	42	9	27	28	43 1/2
Large mill job.....	11	35	5	45	10	29	40	55
Forging job.....	2	40	5/6	52	12	30	46	58
Vise and floor job.....	16	34	7	46	12	32	35	44

in the shop, as is the case under the day's work plan. As long as the rate paid per piece is high enough to keep him interested he will have inducements to keep at work. He will have a chance for individuality, a chance for competition, a chance for personal recognition. His liking for reasonable racing will be cultivated, also his liking for play may be cultivated.

All of these incentives arise because the man feels that his sense of justice is being considered; and he realizes that when the task is properly laid

the employee receiving his share of the benefits through this cooperation.

### BENEFITS DERIVED BY EMPLOYEE AND EMPLOYER

Some of the benefits derived by the men under this system can readily be seen from a report taken from one of the leading manufacturing concerns of New Jersey where both skilled and unskilled labor have shared in its benefits. The report shows that for a period of 12 months the average net increase for mechanics per hour was 6.1 cents, or 26 per cent.



higher wage. The average increase for unskilled labor was somewhat higher, due to the fact that they were put on jobs that were rated at a higher rate of pay than they were receiving for the day's work, for under this system it is equal pay for equal work; that is, if a 20-cent-per-hour man can do the same work satisfactorily and in the time allowed as a 35-cent-per-hour man can he is justly entitled to equal pay on that job.

The benefits derived from the educational value of this system are in no way small. By following the instructions and methods of this system, the men learn to rely upon themselves and acquire a self-sustaining power. There is no need of the foremen speeding the men up to a point where as soon as he leaves the worker naturally slows down. The reward offered induces enough incentive to the man to speed himself up without the supervision of a gang boss.

The accompanying table is a good illustration of some of the direct benefits obtained from the differential bonus plan of wage payment to men on various operations, compared with former rates.

In one manufacturing establishment where the bonus got to be such a big proposition that it became necessary to have two pay days (one for the bonuses or rewards that were earned by the men, which they received each Wednesday, the other the regular pay day on Saturday), a blue envelope was provided for the bonus mid-week pay day and all bonuses earned up to Tuesday night were paid the men Wednesday noon. This scheme was readily appreciated by the men, as they receive direct benefit of their efforts as soon as their task is accomplished. This also helps tie over those who develop financial weakness about the middle of the week and "borrowing on account" has been greatly reduced. But the greatest benefit obtained by the bonus envelope is the feeling that it represents a personal reward for extra efforts and is in addition to the sum which received at week ends may be regarded as covering the regular living and home expenses.

But you may ask, "How about the poor fellow who does not earn a bonus? What effect does it have on him?" It arouses and cultivates that zest for reasonable racing with the possible chance of beating his fellow workman, and before long he becomes so efficient in his work that he too receives his blue bonus envelope on Wednesdays. Without a doubt the adoption of this plan of wage payment of equal pay for equal work is the most satisfactory to both employer and employee in that it supplies the needed incentives, forces cooperation of both party's interest in the work, obtains and maintains an efficient force of men and is a long stride toward social justice.

Preliminary figures place the production of pig iron in Russia in 1913 at 4,660,000 tons, against 4,050,000 tons in 1912 and 3,523,000 tons in 1911. Estimating the imports of pig iron at 50,000 tons, while exports are negligible, the home consumption may be placed at 4,710,000 tons for 1913. This was a considerable increase, the figure for 1912 being 4,093,000 tons.

## FOUNDRYMEN'S NEW SECRETARY

Dr. Moldenke's Successor a Well-Known Iron Trade Journalist

To A. O. Backert, editor of the Foundry, Cleveland, the executive committee of the American Foundrymen's Association turned at once when it became necessary to find a successor to Dr. Richard Moldenke as secretary-treasurer of that organization. Mention was made last week of Mr. Backert's selection and his acceptance. His more intimate connection with the foundry industry dates from 1907, when he became editor of the Foundry. Previous to that time he had represented both the Iron Trade Review and the Foundry in the Pittsburgh district in editorial and advertising capacities. His work in iron trade journalism began in 1900, when he became Pittsburgh representative of the Iron Trade Review. His previous training was in the daily newspaper field at Cleveland, in which he specialized in industrial news and comment. While at Pittsburgh he was chairman of the pro-

gramme committee of the Pittsburgh Foundrymen's Association for six years, and took an active part in the upbuilding of that organization. For two years previous to 1907 he was Western editor of *The Iron Age*, with office at Chicago. In more recent years his activities have not been confined to the Foundry, and he has widened his sphere until today he is manager of the various publications associated with it. Mr. Backert is a native of Cleveland and is 38 years old. His school training was in Central High School Western Reserve University, Cleveland.



A. O. BACKERT  
New Secretary of the American  
Foundrymen's Association

Schleif, Trinks & Co., iron and steel merchants and contractors, 2 Fenchurch avenue, London, England, have been appointed agents for Great Britain and Ireland for the sale and purchase of steel bars, angles, sheets, plates, beams, etc., for J. Feige & Co. and J. Feige, Eisenport, Berlin, Germany. Steel rails and track supplies will be dealt in by the English company on an extensive scale.

The project of organizing a company to establish a large malleable iron plant at Watertown, Wis., has been indefinitely postponed, due to the inability of the promoters to interest sufficient local capital. It is likely that the project will be revived in 1915. E. J. Vanderboom, Milwaukee, one of the promoters, recently negotiated a like proposition successfully in Canada, and the Raulf Company, Milwaukee, is now engaged in the construction of the plant.

The Commercial Club of Superior, Wis., has appointed a committee to gather statistics with a view to securing the location of a blast furnace or other iron manufacturing plant at Superior, either by the organization of local capital or the relocation of a concern established elsewhere. Alfred Terry is chairman of the committee.

One of the longest bridges in the world, if not the longest, will soon be built by Germany. It will give railroad connection between Rugen, an island in the Baltic Sea, and the mainland of Germany. The length will be about 11,000 ft. and the cost about \$5,000,000.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**SALES OF GOODS BY MANUFACTURER.—REMEDY FOR BREACH OF CONTRACT.**—Under a contract by a manufacturer to sell certain articles, he is entitled to deliver articles manufactured by others, if they are of the quality required by the contract of sale, it being only when the contract expressly requires the goods to be of his manufacture that he will not be permitted to deliver another's product. When one who has contracted to sell goods refuses to deliver them the only legal remedy open to the buyer is to claim damages; he cannot maintain a suit to compel the seller to perform his contract, as may be done in the case of a contract to convey land. (United States District Court, Western District of Michigan; *A. G. Lehman Company vs. Island City Pickle Company*, 208 Federal Reporter 1014.)

**VALIDITY OF AGREEMENT IN SETTLEMENT OF EMPLOYEE'S CLAIM.**—Promise by an employer to give an injured employee a position for life, or so long as the employer might remain in business, in settlement of the employee's claim on account of injury, is too uncertain as to the nature of the employment to be given and the amount of the compensation to be paid to support a suit by the employee for breach of the agreement. (Mississippi Supreme Court, *Ingram-Day Lumber Company vs. Rodgers*, 62 Southern Reporter, 230.)

**SALES OF ELECTRIC CURRENT.**—If a contract to sell and deliver electric current at a specified price does not provide who shall bear any loss of current in transmission, the loss falls on the seller. (Minnesota Supreme Court, *Wheeland Electric Company vs. Burmeister*, 141 Northwestern Reporter, 1117.)

**MISTAKE IN TRANSMITTING TELEGRAM.**—Where a company delivered a telegram to a telegraph company for transmission ordering three 8x18 steel split pulleys, but the telegraph company, in transmitting the message, made it read 80 instead of 8, and the seller delivered the larger-sized pulleys, the telegraph company's liability for the mistake was not released because the buyer received the pulleys shipped. (Alabama Court of Appeals, *Jackson Lumber Company vs. Western Union Telegraph Company*, 62 Southern Reporter, 266.)

**DAMAGES RECOVERABLE FOR DELAY IN TRANSPORTING MACHINERY.**—The measure of damages ordinarily recoverable against a railroad company for delay in delivering machinery is the rental value of the machinery during the delay, with the reasonable expense of attempting to secure delivery. (Oklahoma Supreme Court, *Chicago, Rock Island & Pacific Railway Company vs. Reid*, 132 Pacific Reporter, 423.)

**EMPLOYER'S RESPONSIBILITY FOR DEFECTIVE MACHINERY.**—On suit by an employee for injury received while operating a machine, it is no defense that he violated a rule of the employer, if that rule had been habitually disregarded by workmen, and the injured employee did his work in a customary way. An employer who negligently fails to repair a machine is not entitled to notice from an employee of the defective condition before the latter can recover for consequent injury, but if there is no negligence in the making of repairs the employer is entitled to notice of failure of a machine to work properly. (Missouri Court of Appeals, *Shimp vs. Woods-Evertz Stove Company*, 158 Southwestern Reporter, 864.)

**WORKMAN'S DUTY AS TO OWN SAFETY.**—An employer is not liable for injury to a workman, which the latter could avoid in the exercise of reasonable care for his own safety. (Alabama Supreme Court, *Woodward Iron Company vs. Marbut*, 62 Southern Reporter, 804.)

**CONTRACT TO SELL MANUFACTURING PROCESS.**—The Flexilis Works, Berlin, Germany, agreed to give defendant for \$75,000 the exclusive right to use in North America a process for making crucible steel castings, and especially "steel castings which do not require a malleable lining process, and which immediately after being removed from the molds, and cooling off and cleaning, are ready to be used and worked; when refined steel and particularly difficult castings are produced, a reheating of not more than five hours shall be required." A penalty of 100,000 marks was fixed for

violation of the secrecy of the process. Held, that the contract contemplated sale of a process not previously known in the trade, and that if the German process was not such the defendant was not liable for a balance due on the contract. (United States Circuit Court of Appeals, Third Circuit, *Flexilis Works vs. Hess*, 205 Federal Reporter, 850.)

**LIABILITY OF BANKS FOR HONORING UNAUTHORIZED CHECKS.**—A bank which honors a check drawn by an agent of a depositor for a purpose known to the bank to be unauthorized is liable to the depositor as for misappropriating the funds. (Texas Court of Civil Appeals, *W. R. Miller & Co. vs. Hobdy*, 159 Southwestern Reporter, 96.)

**INJURY TO FOUNDRY EMPLOYEE.**—Under the general rule that, when an employer manufactures or alters an appliance used by his workmen, he is chargeable with notice of such defects as would be disclosed in the exercise of ordinary care for the safety of his employees, a foundry company is liable for injury to a laborer caused by the breaking of a handle on a brail used in carrying a crucible of molten brass, and consequent spilling of the metal on him, where the brail had been hurriedly altered to fit the crucible. (Kansas Supreme Court, *Baker vs. United Iron Works Company*, 133 Pacific Reporter, 737.)

**RIGHT OF APPRENTICE TO COMPENSATION.**—When a contract of apprenticeship provides, as an incentive to faithful performance on the apprentice's part for the contract term, that, in addition to hourly wages, he shall be paid a certain amount for each day's work, he is not entitled to the extra allowance on refusing to perform the full term of apprenticeship. Hence, where an apprentice molder was discharged for neglecting his work after his demand for an increase in wages beyond those fixed by his contract of apprenticeship was refused, he was not entitled to recover the extra per diem allowance which the contract provided for in the case of faithful performance. (Michigan Supreme Court, *Lepan vs. MacKinnon Boiler & Machine Company*, 144 Northwestern Reporter 693.)

**RIGHT TO ENJOIN COMPETITION.**—A corporation is entitled to enjoin one of its officers and directors from establishing a competing business in such way as to threaten the success of the company. (New Jersey Court of Chancery, *Hussong Dyeing Machine Company vs. Morris*, 89 Atlantic Reporter 249.)

**PATENT INFRINGEMENT BY PATENTEE.**—A patentee who has assigned his rights to an invention cannot defeat liability for infringing the patent by showing that he was induced to assign it through unfair representations, but he has a legal remedy for any damages sustained on account of any fraud practiced upon him. (United States Circuit Court of Appeals, Second Circuit; *Vacuum Engineering Company vs. Dunn*, 209 Federal Reporter 219.)

**RESERVATION OF TITLE BY SELLER.**—When machinery is sold under a contract reserving title in the seller until payment of the price, his failure to record the contract does not defeat his right to reclaim the machinery as against the purchaser or one who took a mortgage on the real estate upon which the machinery has been installed before the machinery was purchased. (New York Supreme Court, Appellate Division, Fourth Department; *Ratchford vs. Cayuga County Cold Storage & Warehouse Company*, 145 New York Supplement 83.)

**RECOVERY FOR LOSS OF FREIGHT IN TRANSIT.**—Junk was shipped by one who had contracted to sell it at the destination at a certain price per pound. Held that he was the proper person to sue for loss of part of the shipment in transit. (Iowa Supreme Court, *Almon vs. Chicago & Northwestern Railway Company*, 144 Northwestern Reporter 997.)

**DUTY TO PROVIDE FIRE ESCAPES.**—Violation of the provision of the New York labor law which requires factories more than three stories high to be provided with fire escapes renders a manufacturer liable for injury to or death of an employee directly attributable to such omission. (New York Supreme Court, Appellate Division, Third Department; *Amberg vs. Kinley*, 145 New York Supplement 394.)



## Interesting Oil Pumping Contract

The National Transit Company, Oil City, Pa., has secured a contract to furnish the complete mechanical equipment for the pumping stations on a new pipe line of the Penn-Mex Fuel Company, which is to extend from Tuxpan, Mexico, on the Gulf Coast, to the oil fields of the interior, a distance of about 30 miles. Three pumping stations are to be built, the first near the oil fields, the second or intermediate station about 17 miles from the initial station, and these two stations will deliver to tanks on the coast. The third or terminal station near Tuxpan will pump oil to the tank steamers in the harbor.

The line will consist of a single line of 8-in. pipe, but a second will eventually be laid. There will also be a 4-in. water line from the initial to the intermediate station to supply water to the latter. The oil is black, about 20 deg. Baumé, and of high viscosity. To be pumped successfully, it must be heated to about 160 deg. F. In the pump house will be one National 30 x 52 x 6½ x 36-in. horizontal cross compound crank and flywheel pumping unit, with provision for two more. The oil end consists of three double-acting plunger pumps arranged on the opposite side of the crankshaft from the steam cylinders with the plungers bolted to a common crosshead. These units have a total weight of 300,000 lb. and at 42 r.p.m. are to deliver 42,000 42-gal. barrels of oil at a pressure of 800 lb. The boiler house will be equipped with four 60 in. x 16 ft. horizontal return tubular boilers, utilizing fuel oil. In the suction line of the main pumps will be two 60 in. x 17½ ft. oil heaters with 2-in. tubes. These are of National Transit design and will act as surface condensers for the main pumping unit. Oil will pass through them in parallel, or in other words, one-half of the oil will pass through each heater, and the oil will pass through the tubes.

The intermediate station will be a duplicate of the initial station. The terminal station will be equipped with two 16 x 24 x 14 x 24-in. National compound duplex piston pumps, each of which is rated to deliver 55,000 bbl. of oil at 200 to 250 lb. pressure through a mile or more of 8-in. line laid in the harbor to the loading plate of the tank steamers. The feed heaters will be 250 h.p. capacity. There will be three 6 x 4 x 6-in. National Transit Company duplex boiler feed pumps, otherwise the equipment will be like that at the initial and intermediate stations. The National Transit Company is furnishing not only the above machinery and equipment, but all cranes, fittings, fire plugs and necessary appliances. A similar installation was made by the company three years ago on a pipe line between Bakersfield and San Francisco, Cal. That line has 19 pumping stations in which are installed 42 of the pumping units described. The National Transit Company has just placed through West Virginia several of its 20 x 36-in. gas engines of 400 h.p. for the Hope Natural Gas Company.

According to the American consul-general at Mukden, Manchuria, the Pen Hsi Hu Colliery & Mining Company will increase its capitalization to about \$500,000 to erect a blast furnace with capacity of 100 tons of pig iron a day. Later three other furnaces may be built, also a steel plant. The iron ore in sight is put at 80,000,000 tons, mainly magnetite, some of it as high as 70 per cent. iron. The lower grades will require magnetic separation. The coal fields show about 120,000,000 tons of semi-anthracite coal, low in sulphur and of good coking quality. German boilers of 12,000 hp. have already been shipped.

The proportion of imported iron ore to the total consumed in Germany has declined in the last three years from 50 to 45 per cent. This is partly due to reduced freight charges introduced for trainloads of 500 tons of ore for 300 miles, and also to the greater attention paid to the utilization of the poorer qualities of ores by briquetting and concentration. Importations now consist principally of Swedish magnetic ore under long time contracts.

## Pittsburgh and Valleys Business Notes

The Cambria Steel Company, Johnstown, Pa., has recently deeded 118 houses to employees who desire to own their own homes, provision being made so that payments on the properties are secured to the company.

The Banfield Clay Company, Irondale, Ohio, started its new plant in operation on Monday, March 1, and is equipped to manufacture building block, fireproofing, flue lining, mill brick, wire-cut paving brick and repressed paving block. The daily capacity is 200 tons of clay products.

The Best Engineering & Supply Company, Pittsburgh, is agent in the Pittsburgh district for Craig Ridgway & Son, Coatesville, Pa., builders of hydraulic elevators; the Merritt Hydraulics Company, Philadelphia; the Weber Concrete Chimney Company, Chicago; Warren Elevator Mfg. Company, Cincinnati, and the B. Franklin Hart, Jr. & Co., New York City.

The Pittsburgh Plate Glass Company, Pittsburgh, has recently placed in operation a 3000-hp. Beyer condensing plant, built by the Cresson-Morris Company, Philadelphia. This type of condenser has some new features and is the first of the kind to be put in operation in the Pittsburgh district.

The annual meeting of stockholders of the La Belle Iron Works, Steubenville, Ohio, will be held in the Auditorium, Wheeling, W. Va., on Tuesday, March 10.

Stockholders of the Youngstown Sheet & Tube Company, Youngstown, Ohio, have been informed that holders of the common stock of record March 1 will be permitted to subscribe at par, \$100 a share, on or before April 1 for 20 per cent. on their holdings in new common stock. Subscriptions are to be paid in four installments of 25 per cent. each on July 1 and October 1, 1914, and January 1 and April 1, 1915. Transactions in rights to fractional shares will be on the basis of \$175 a share.

On Monday, March 2, the Pope tin plate works of the Phillips Sheet & Tin Plate Company at Steubenville, Ohio, was put in full operation. The plant contains 12 hot mills.

On March 1 all the blast furnaces of the National Tube Company, with the exception of one of the five stacks at Lorain, Ohio, were in blast. No. 2 furnace in the Wheeling district went in February 18.

## Late Ore Analyses

E. N. Breitung & Co., Cleveland, have issued their iron ore analysis book for 1914. It is bound in black morocco and contains a number of blank pages for memoranda. No change is made from the ores listed by this firm in 1913, which include sixteen ores from the Marquette range, one from the Menominee range and one from the Michipicoten range.

Oglebay, Norton & Co., Cleveland, have listed one new ore in their analysis book, mention of which was made last week. This is the Glyuna, a soft red hematite from the Yale mine in the Bessemer district of the Gogebic range. The ore runs 59.50 per cent. iron, dried at 212 deg., and 51.47 per cent. iron natural. An innovation is a publication of sieve tests of the seven Mesaba range ores offered by this firm.

The Interstate Commerce Commission's investigation, ordered by the United States Senate, into the charge made by David Lamar, that the United States Steel Corporation has been receiving illegal rebates for the past six years, got down to bed rock in two days and promises to end in a fizzle. When Lamar and his witnesses had completed their testimony it became apparent that a lot of old straw was being threshed over.

The National Steel Car Company, Hamilton, Ontario, has sufficient orders on its books to occupy it well into the spring, its capacity being 25 to 30 cars a day. The company's report for the year ended November 30, 1913, shows net profits of \$157,153, after deducting \$86,074 for renewals and repairs. No dividend has yet been declared on the \$1,500,000 of preferred stock.



ESTABLISHED 1855

# THE IRON AGE

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## EDITORS

GEO. W. COPE

A. I. FINDLEY

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

## Improving the Mill Repair Shop

The new tariff schedules have had the effect in some important lines of manufacture of impelling owners to look keenly toward decreased cost of production. This is particularly true of certain branches of industry which have been notoriously lax in their repair departments. Obsolete machinery is used to do more or less nice work in making repairs and in part replacements. The waste is easily apparent, and in at least a few cases managers have turned their attention to what to them is a minor department of their mills, in the belief that the additional investment in modern metal working machinery should reap substantial returns.

To select a single industry, the repair shops of the textile mills, even those of large size, have been the subject of much debate between the managers and machine tool experts. Few of these shops contain anything that is modern. Not one in a hundred of the machines can stand up to a moderate cut with high speed tools. No grinding machines are employed, so that the finish has to be that left by such a lathe or planer or shaper, and that means it is far below modern standards. The output is slowly, laboriously fashioned. The average owner asserts that such machinery is good enough for the purpose; that it is seldom used, comparatively speaking, and consequently to tie up even a moderate amount of money in better repair facilities is undesirable. He fails to take into account, however, the losses which accrue from the unnecessary idleness of the high class machinery which is manufacturing his product, through delay in perfecting repairs. The difference in time required to accomplish a given task, between a modern machine tool and one of 20 years ago (few of the repair shop machines are younger than this, and most of them are older) is too well understood to need analysis. What can be done in an hour on a first rate engine lathe would take a day or more, perhaps, on an old time machine. Also, the advantages of plain cylindrical and surface grinding machines in securing accurate parts is obvious.

Today the textile manufacturers are beginning to regard the subject with broader vision. Some of them are replacing the older machines which regularly manufacture their product, because they realize that they must have the best if they are to continue to compete successfully. Naturally their attention should turn also to the machines which will keep the new equipment in good physical condition.

Replacements of repair shop equipment may be made gradually. Certain machines should be of the best, in order that the work may be done quickly and well. Others, which are not usually called upon in an emergency, may be retained without serious consequences. In a recent instance a cotton mill installed a first rate engine lathe and a cylindrical grinding machine, with most advantageous results. This industry, which has confined itself almost exclusively to second hand machinery, now promises to become a more important field for the latest models.

## Express Service Still Needed

The tendency of reforms to go too far is illustrated in the case of express service. A few years ago a great outcry was made against the charges by express companies, and their excessive profits formed a topic for bitter denunciation by merchants and others who had occasion to use such service. The inauguration of the parcel post for packages up to 11 pounds was hailed as offering desirable relief from the imposition of these charges. It was not claimed at the time that express service was something which could easily be accomplished by the Government, but the establishment of the parcel post was looked upon as offering healthy competition with the express companies.

We have now had a year's trial of the parcel post, and its original limitations have been so extended, first to 20 pounds and on some articles to 50 pounds, that the business of the express companies is rapidly dwindling. So much have the revenues of these companies fallen off that one of the oldest and largest is stated to be on the point of liquidating and retiring from business while it still has valuable assets to divide among its stockholders. This has given alarm to merchants, who believe that the extinction of express service would be a serious loss to them. Express companies perform functions which the parcel post does not and perhaps cannot perform. The Merchants' Association of New York, which was a leader in the movement for the reorganization of the express service and the division and reduction of express rates, is now appealing to Congress not to permit the Postmaster General to make a further extension to 100 pounds of the weight limit of parcels which may be transmitted by mail. It is claimed that no social or economic benefit will result from substituting the parcel post for the express service beyond the limits

now established, but that on the contrary serious harm to the country's traffic facilities will ensue, with a probable loss resulting from parcel post operations, to be borne by the public treasury. There would undoubtedly be a loss now if the railroad companies were adequately paid for the transportation of merchandise by mail.

### Our Impotent Patent Laws

Another notable inventor has added his testimony to that of innumerable predecessors on the lack of protection afforded by our patent laws. Orville Wright, who with his recently deceased brother Wilbur, perfected the aeroplane, has at last succeeded in establishing the validity of that invention against infringers and has told the story of his experience to the world. His advice, based on his experience, is that any inventor should completely withhold all knowledge of his invention from the public and from the Patent Office as well until he has obtained a backing of at least \$200,000 to be used in fighting through tedious court processes his right to the ownership of his invention and all that that implies.

The experience of Mr. Wright simply shows what has often been demonstrated before, and that is that every inventor who takes out a patent merely gets, under our imperfect patent laws, a document which permits him to defend his invention against those who infringe or copy it. Every inventor who has gone through this experience feels naturally that he has a grievance against the laws. Men of bright intellect, who lack the peculiar genius known as the inventive faculty, are constantly on the alert for an opportunity to profit by copying some invention which has in it the elements of commercial success. That they are able to do so with impunity, in case the inventor is without financial means or substantial backing, is disgraceful. If the patent laws were amended so that the Government would prosecute infringers, as it does thieves and other offenders against property rights, the opportunities for this sort of sharp practice would be greatly lessened and possibly invention would be stimulated. The sharp mechanic or manufacturer who filches the work of a poor inventor and the attorneys who find profitable employment in prosecuting and defending patent claims secure too much of the benefit of our present patent system.

### Use and Abuse of Emergency Kits

The emergency kit for first aid to the injured has been so widely adopted in American industrial works that it may now be considered an institution. State laws compelling its use, together with the new conditions resulting from workmen's compensation, have combined with philanthropic motives to give double assurance of the skilful treatment of injuries. The kit, consisting of a cabinet or jar containing bandages, plaster, tourniquet, antiseptic solutions, ointment for burns and a few familiar instruments, has been through several years of testing and has demonstrated its usefulness and also its deficiencies. Ignorance as to its application has to a certain extent neutralized its value.

In large plants where the total number of acci-

dents is necessarily high, much attention is given to the treatment of the victims. There is a works hospital, with trained nurses constantly on duty and a good surgeon on call. Specialists are consulted for cases beyond the skill of the regular practitioner. Only a comparatively few plants, however, can afford so complete a system. The emergency kit is the substitute. It is always ready for use, complete in all essential details.

A large English works manufacturing machinery has developed a system which has proved highly satisfactory. Emergency cabinets are distributed by departments. The department head or his clerk is taught to render first aid in minor injury, while a man more highly skilled is available in the factory to attend to more serious cases. The idea could be adopted with advantage in many American factories. It is safe to say that among the relatively small plants in this country too few employees are charged with responsibility in this regard. The management should periodically ascertain the number in the various parts of the plant who have been given at least superficial training in the use of the emergency equipment at the hands of a surgeon commissioned for the purpose. As vacancies are noted, the new selections can be made and familiarity with aid-to-injured procedure maintained at the proper level. It is desirable, of course, that those be chosen for this duty who have a decided liking or even aptitude for it.

### Our Growing Iron and Steel Exports to the Philippines

WASHINGTON, D. C., March 4, 1914.—The extraordinary progress, commercially and industrially, of the Philippine Islands in the past five years is shown by figures just compiled by the Bureau of Insular Affairs of the War Department. The imports of the islands have increased from \$27,792,397 in 1909 to \$56,327,583 in 1913, a gain of more than 100 per cent., while the exports have risen from \$58,785,960 to \$110,010,909, an increase of nearly 100 per cent. The share of the United States in the commerce of the islands has increased in a far greater ratio than the gain in the total commerce. In 1909 the United States supplied \$4,691,770, or a little less than 20 per cent., while in 1913 we furnished \$25,387,085, or nearly one-half the total imports. In 1909 the United States took \$14,907,101, or slightly less than 25 per cent. of the exports of the Philippines, while in 1913 we absorbed \$45,235,970 worth, or more than 40 per cent.

In the five years under consideration the total imports of the islands under the metal schedule have risen from \$1,933,475 to \$6,608,917, a gain of approximately 250 per cent. In the same time the share of the United States in these imports has risen from \$818,991, or about 40 per cent. of the total, to \$4,467,147, or more than 66 per cent., and an actual gain of about 450 per cent. The figures by years are as follows:

Year	Total Imports	From United States
1909.....	\$1,933,475	\$818,991
1910.....	3,305,701	1,970,490
1911.....	5,917,596	3,924,418
1912.....	6,069,049	4,271,647
1913.....	6,608,917	4,467,147

The total value of the metal schedule shipments of Great Britain in 1913 was only \$1,070,584, or less than one-fourth the amount supplied by this

**Mechanical and Civil Engineers,  
PITTSBURGH, PA.**



country. Germany was next in rank with \$619,728, while no other country contributed \$100,000 worth.

Approximately 40 per cent. of the total imports of the Philippine Islands under the metal schedule consists of machinery of various kinds, the imports of this class in 1913 being valued at \$2,591,539, as compared with \$525,731 in 1909, an increase of about 400 per cent. Of the imports of this class the United States supplied \$1,553,605, or about 40 per cent. of the total, the United Kingdom being second with \$653,333, and Germany third with \$158,086.

Some of the items in the shipments from the United States are the following: Locomotives, \$165,049; stationary engines, \$119,563; boilers, \$100,158; sewing machines, \$251,956; sugar machinery, \$108,299; typewriting machines, \$119,163. In iron and steel products are these items for the United States: Bars or rods, \$232,436 out of \$295,807; firearms, \$252,648 out of \$254,695; pipes and fittings, \$238,218 out of \$320,140; rails, \$271,995 out of \$325,432; corrugated roofing, \$585,493 out of \$642,928; structural iron and steel, \$168,548 out of \$233,896; sheets and tin plates, \$183,725 out of \$214,876; tools, \$176,447 out of \$247,612.

Perhaps the most significant fact in connection with this trade is the success of the "open door" policy which the United States has maintained with respect to the Philippine tariff. American manufacturers have not been aided by preferential rates, but have been obliged to meet all comers, and, in the case of English and German producers, have found their rivals on the ground and well intrenched with local representatives of experience and good standing and with superior banking connections.

W. L. C.

## Correspondence

### Political Economists and the New Banking Law

*To the Editor:* The political economists would say, if the writer has read them aright, that the new banking law might fitly be entitled "An Act to Aggravate the Cause and Increase the Intensity of Financial Panics," and by a means in itself very costly—inflation rediscounting (not rediscounting with currency already in existence, but with currency freshly manufactured for the occasion), promptly turned by its own effect upon business into specie rediscounting.

They would explain that financial panics are caused by industrial depressions—the great capitalists turning their backs on new enterprises, and a little later backing out of old ones; and that these industrial depressions in their turn are caused by over-speculation, over-production of the means of production, over-cost of production, or perhaps all three of these combined, and probably also with a liberal allowance of government intermeddling to season the unsavory dish which the capitalist has to sniff dubiously. The new law with its free, or at least easy, loans in times of distrust and stringency, when business is already overdone or production has become abnormally risky and costly, must heighten and prolong these evil conditions, and increase therefore the severity of the panic when it ultimately comes.

And that the inflation rediscounting is at such a time a costly performance in itself would be explained thus: Although it is only in these times of doubt and stringency that inflation rediscounting is really inflation, either of the currency or of credit, yet it then certainly is both, for the demand for money in loans no longer corresponds to the demand for money for exchange of commodities, but has run ahead of it. In other words, the demand for bank credit is no longer an accurate

barometer of business, but is based on an expectation of business that will not be realized. A recession in business is then inevitably due, and has already begun in the turning down of new enterprises. So the inevitable results, of inflation follow. Higher prices, sterling exchange against us, and an outflow of gold, the demand for gold then causing the rediscounting treasury notes to come promptly piling back on the federal reserve banks—either directly or through the treasury—for redemption in gold. That is to say, the inflation rediscounting in times of stringency is really rediscounting in gold, as far as the federal reserve banks are concerned, a business which will pay only half profit rate.

But since these evil effects of the new law can originate only in the incubation or stringency stage of financial panics, they will happily be missing under present conditions, because that stage is already passed. What may also happily be missing in the present instance is the financial panic itself. For there is the very strongest reason for hope—which would be still stronger if the busy government could bring itself to let business alone—not only from the current trend of events—the panic not coming right on the heels of the stringency as usual—but also from the clarifying effect of the comparatively recent 1907 storm, that recession has been prompt enough and thorough enough to avert more serious consequences.

In justice to the new law it must be said that it can easily be made as good as the old one by an unpopulist Federal Reserve Board and a high rate of discount in abnormally tight times. But if the economists are right, the problem must be attacked from a different quarter. Panics must be abolished by eliminating industrial depressions. It is the capitalist who must be protected. Laws that in all times and in all countries bring about the abnormal conditions (chief of these being high cost of production) which periodically drive the capitalist out of business, must be ferreted out and repealed. Nothing else will do. Fresh laws, especially of present day populist type, will only aggravate.

GEORGE AUCHY.

Tacony, Philadelphia, February 23, 1914.

## SOME SAFETY FIRST HINTS

Compiled by the Factory Superintendent of the  
Burroughs Adding Machine Company

A. Brain, factory superintendent of the Burroughs Adding Machine Company, Detroit, Mich., in a magazine issued to the employees gives some safety and sanitation hints. A copy of the list can undoubtedly be had by applying to the company, so only a number of them need here be given.

1. Treat your shopmates with courtesy and work in harmony with them.
2. Avoid wearing loose fitting clothing and jewelry or gloves on the hand, especially around machine tools.
3. Adjustments and oiling should be avoided when a machine is running.
4. When operating a machine give the work your undivided attention. It may save spoiling a job, if not more serious damage.
5. It is extremely dangerous to set cutting tools in a moving machine.
6. Do not lounge on a moving machine and keep a respectable distance from all moving parts, especially gears and cutters.
7. When through work clean the bench, vise or machine with brush and waste, and see that all small tools are returned and checked.
8. Form the habit of never standing in line with swiftly revolving parts, such as emery wheels, pulleys, etc.
9. Never pound or hammer a file.
10. An orderly exit of employees at noon and end of the day is important, especially when it is necessary to descend staircases.
11. The wearing of long coats by workmen will be discouraged. Aprons not ragged and fastened with strings that will not break easily under strain are better.
12. When handling a belt between two overhead pulleys, never place the ladder between the shafts nor rest it against a revolving shaft.
13. Do not be ashamed to shift belts with a stick instead of the hand, and for overhead work, always use a stick reaching nearly to the floor.
14. Do not wipe chips from revolving cutter with the fingers on a steel scale. Use a brush on the off side and with care.
15. Never reach across the revolving oiler to regulate the oil feed.
16. Hang up oil soaked clothing so that air will get to them.



## Swedish Silico-Manganese

Ivar Setterberg, mining and metallurgical engineer, is now in the United States in the interest of the silico-manganese product of the Vargöns Company, Trollhättan, Sweden. This alloy has been in use at a number of Swedish works for some time, being substituted in steel making for ferrosilicon and ferromanganese. The analysis is about as follows:

Silicon and manganese together, 90 to 96 per cent.  
Phosphorus, 0.030 to 0.070 per cent.  
Sulphur, 0.010 to 0.015 per cent.  
Carbon, about 2 per cent. at 17 per cent. silicon.  
Carbon, about 0.3 to 0.5 per cent. at 25 per cent. silicon.  
Carbon, about 0.1 to 0.2 per cent. at 30 per cent. silicon.

The proportions of the silicon and manganese can be varied so that the alloy will contain from 17 to 50 per cent. silicon, while the range of the manganese will be 73 to 79 or 40 to 46 per cent.

The additions of silico-manganese to the molten steel are made in the same way as those of ferromanganese and ferrosilicon. Several advantages are claimed for the silico-manganese. While considerable iron is added to the steel with the alloys commonly used, the newer alloy is composed almost entirely of manganese and silicon and therefore the loss of heat is reduced. There is better protection of the manganese from oxidation, hence there is a saving in the amount used. The percentage of carbon in the silico-manganese is low, which is desirable in the production of soft steel and reduces the time required for making a heat.

## British Iron and Steel Exports

British iron and steel exports for January, 1914, show an increase in tonnage and value, as compared with the same month in 1913. The total sent abroad during January, 1914, excluding iron ore and scrap, was 454,794 gross tons, as compared with 439,035 tons in January, 1913, an increase of 15,759 tons. In values the increase was £35,930, the total exports for January, 1914, being valued at £4,863,659, as against £4,827,729 for January, 1913. Pig iron starts the year with a decrease in exports of 19,782 gross tons, similar to 1913, the total for January, 1914, being 82,182 tons, as compared with 101,964 tons in January, 1913. The exports of galvanized sheets were 13,902 tons greater in January, 1914, than in the same month of 1913, being 77,427 tons, as compared with 63,525 tons in January, 1913.

Imports of iron and steel, excluding iron ore and scrap, for the month of January, 1914, were 181,249 gross tons, as compared with 221,451 tons in January, 1913, a decrease of 40,202 tons. The values for these two months are, respectively, \$1,218,040 and \$1,469,352. In 1913 imports largely exceeded records for the previous year.

The Munning-Loeb Company, Matawan, N. J., has brought out a carboy rocker for use in handling and pouring acids and other chemicals or liquids from carboys. The rocker, which weighs only 11 lb., is built of metal-bound wood and is equipped with castor wheels, thus combining the advantages of a hand truck and carboy rocker in one appliance. The rocker can be attached to a carboy or changed from one to another in less than ½ min. A vent tube used in connection with the rocker makes the flow of liquid from the carboy uniform and free from bubbles and spattering.

Color photography, its processes and results, is to be described and demonstrated by the originators of the processes at a meeting Tuesday evening, March 10, to be held at the Engineering Societies Building, New York, under the auspices of New York members of the American Society of Mechanical Engineers, the American Institute of Mining Engineers and the American Electrochemical Society.

Westinghouse, Church, Kerr & Co., 37 Wall street, New York, have established a laboratory for testing concrete aggregates and waterproofing materials and for the investigation of paints and preservative coatings for steel and concrete.

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## New Massillon Open-Hearth Plant

The Massillon Rolling Mill Company, Massillon, Ohio, has completed plans and is placing contracts for its new open-hearth steel plant. It will include three 50-ton furnaces, a 34-in. blooming mill and a 28-in. bar mill. Space will be provided for eight open-hearth furnaces, so that additional ones can be installed later. The plant will be operated entirely by electricity. The contract for the electrical equipment has been placed with the Westinghouse Electric & Mfg. Company. Of the power required, 60 per cent. will be purchased from the Massillon Electric & Gas Company and the remainder will be generated by low-pressure turbines.

A meeting of the officers and directors of the company will be held March 30, at which it is planned to increase the capital stock from \$1,000,000 to \$3,500,000, and the name of the company will probably be changed. F. J. Griffith, who for the past 10 years has been connected with the United Steel Company, Canton, Ohio, as assistant to John T. McConnell, general superintendent, will be general superintendent of the new open-hearth plant. Mr. Griffith has a reputation as an expert in making special steels. H. Masterstick, Youngstown, Ohio, has been engaged as constructing engineer for the new plant. The Massillon Rolling Mill Company will also enlarge its present plant by the installation of two additional hot mills and one additional cold mill.

## PIG-IRON PRODUCTION

### A Marked Increase in February

#### Net Gain of 21 Active Furnaces Due to Increased Steel Works Operations

In spite of the interruptions to mail and wire service in the past week, reports of pig-iron production in February have come to this office from all but three of the furnaces usually reporting. Estimating in these cases, our figures show an output of 1,888,813 gross tons of coke and anthracite pig iron in the 28 days of February against 1,885,054 tons in the 31 days of January. The daily average was thus 67,458 tons in February, against 60,808 tons in January, an increase of 6650 tons.

The steel companies' production in February was 1,330,127 tons, or 47,505 tons a day, against 1,261,430 tons in January, or 40,691 tons a day. The increase was thus 6814 tons a day. Merchant furnaces fell off slightly, their production last month being at the rate of 19,953 tons a day, against 20,117 tons a day in January.

The net increase in active stacks in February was 21, there being 218 in blast on March 1 against 197 on February 1. The Steel Corporation blew in 15 furnaces last month, the independent steel companies 5 and the merchant furnace companies 4, a total of 24. Three furnaces were blown out in the month.

#### DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from February, 1913, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel works	Merchant	Total
February, 1913	64,005	28,364	92,369
March	61,448	27,699	89,147
April	64,658	27,101	91,759
May	64,232	26,807	91,039
June	62,002	25,617	87,619
July	59,362	23,239	82,601
August	59,140	22,981	82,121
September	60,941	22,590	83,531
October	59,630	22,503	82,133
November	52,434	22,019	74,453
December	41,879	22,108	63,987
January, 1914	40,691	20,117	60,808
February	47,505	19,953	67,458

#### OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in February and the three months preceding:

Monthly Pig-Iron Production—Gross Tons			
	Nov. (30 days)	Dec. (31 days)	Jan. (31 days)
New York	130,198	111,493	101,966
New Jersey	11,298	11,790	11,341
Lehigh Valley	78,046	74,766	73,263
Schuylkill Valley	52,297	62,564	55,831
Lower Susquehanna and Lebanon Valley	41,032	39,871	37,814
Pittsburgh district	579,366	469,902	441,688
Shenango Valley	111,802	74,488	85,076
Western Pennsylvania	132,029	140,327	127,011
Maryland, Virginia and Kentucky	54,378	47,893	37,603
Wheeling district	80,097	78,633	83,193
Mahoning Valley	244,870	179,530	165,881
Central and Northern Ohio	169,213	162,702	155,503
Hocking Val., Hanging Rock and S. W. Ohio	42,561	49,415	41,880
Chicago district	284,641	247,031	228,439
Mich., Minn., Mo., Wis. and Col.	47,422	55,012	64,173
Alabama	160,011	161,554	157,616
Tennessee	14,342	16,636	16,776
Total	2,233,603	1,983,607	1,885,054

#### PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel

companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

#### Production of Steel Companies—Gross Tons

	Pig, total production—			Spiegeleisen and ferromanganese		
	1912	1913	1914	1912	1913	1914
Jan.	1,483,153	1,981,560	1,261,430	22,622	15,633	15,385
Feb.	1,550,995	1,792,154	1,330,127	15,950	20,131	11,022
Mar.	1,827,792	1,904,878	.....	11,538	20,546	.....
Apr.	1,830,717	1,939,751	.....	11,194	23,108	.....
May	1,922,557	1,991,192	.....	20,518	19,042	.....
June	1,823,958	1,860,070	.....	26,685	19,212	.....
July	1,803,205	1,840,216	.....	26,522	22,310	.....
Aug.	1,843,404	1,833,352	.....	24,225	20,680	.....
Sept.	1,773,073	1,828,232	.....	22,484	24,555	.....
Oct.	1,947,426	1,848,634	.....	27,252	19,499	.....
Nov.	1,884,524	1,573,007	.....	17,461	26,765	.....
Dec.	1,876,870	1,298,262	.....	18,523	14,095	.....

Among the furnaces blown in in February were two Lackawanna at Buffalo, one Carrie, two Clairton, one Duquesne, one Edgar Thomson, one Aliquippa and one Monongahela in the Pittsburgh district, one Cambria in western Pennsylvania, two Farrell in the Shenango Valley, Norton in Kentucky, Riverside in the Wheeling district, two Ohio and Hannah in the Mahoning Valley, one Central at Cleveland, two South Chicago, one Iroquois and two Gary in the Chicago district, Tuscaloosa and one Woodward in Alabama.

Among furnaces which became inactive last month were one Brooke (banked) in the Schuylkill Valley, Ironton in the Hanging Rock district and one Calumet in the Chicago district.

#### Blast Furnace Notes

On March 1 the Carnegie Steel Company had 39 blast furnaces going out of a total of 58. Farrell No. 1 blew in February 23 and Clairton No. 2 February 28. All three stacks at Farrell, Pa., are now in operation, and five of the six stacks at the Ohio works, Youngstown, are running. No. 3 Ohio stack blew in February 20.

On Sunday, March 1, the Republic Iron & Steel Company blew in its No. 4 Haselton furnace and is now operating all of its five furnaces in the Youngstown district and Atlantic furnace at Sharpsville, Pa. Hall furnace at Sharon is being relined and repaired and will be ready for blast when the company needs the iron, but at present no date has been set for starting.

The Thomas Furnace Company, Milwaukee, expected to blow in its furnace this week.

The E. & G. Brooke Iron Company, Birdsboro, Pa., banked its No. 2 blast furnace February 9, and it will not resume for a number of weeks.

The Lackawanna Steel Company now has three of its seven furnaces at Buffalo in blast, two having gone in in February.

No. 1 Calumet furnace of the Wisconsin Steel Company, South Chicago, Ill., was blown out February 28 for relining and enlargement. The furnace will probably blow in again about June 15.

The Cambria Steel Company, Johnstown, Pa., blew in its No. 7 furnace in February after rebuilding. Seven out of the eight stacks are now active. The rebuilding of No. 1 furnace is still in progress.

The steel output of Germany in 1913 was 18,958,819 metric tons of ingots. The quantity of Thomas or basic Bessemer steel was 10,629,697 tons, and basic open hearth, 7,339,314 tons. The total production in 1912 was 17,148,631 tons.

The C & C Electric & Mfg. Company, Garwood, N. J., announces that the Indianapolis territory will be taken care of temporarily by its Cincinnati representative, F. A. Saylor, Sixth and Vine streets, Cincinnati, Ohio.

# The Iron and Metal Markets

## LARGE GAIN IN PIG IRON

### February Output Up 6650 Tons a Day

#### Mill Operations Maintained, Though New Orders Have Been Falling Off of Late

Our blast furnace statistics for February, which are remarkably complete considering the serious crippling of telegraph and mail service, show plainly the increase in steel works operations last month. The production of pig iron in the 28 days of February was 1,888,813 gross tons, or 67,458 tons a day, against 1,885,054 tons in January, or 60,808 tons a day. The steel companies produced 1,330,127 tons last month, or 47,505 tons a day, against 1,261,430 tons in January, or 40,691 tons a day.

The steel companies blew in 20 furnaces in February—the Steel Corporation 15 and the independent companies 5. Four merchant furnaces were blown in and three were blown out. Thus the net gain in active furnaces was 21, there being 218 in blast March 1 against 197 one month previous. In addition, the Steel Corporation has blown in Newburgh furnace at Cleveland and No. 1 Joliet furnace this week.

Production in January was at the rate of 22,200,000 tons a year; in February the rate was 24,600,000 tons a year, a gain of 2,400,000 tons or about 11 per cent. The furnaces enter March at a considerable increase over the February rate.

The blockades of traffic by snow storms in the past week caused the worst tie up of Eastern business in years. In the Central West while a few cases of coke shortage are reported, the operations of blast furnaces and steel works were not seriously interfered with; but there is a freight congestion on all roads east of the Great Lakes and in the central district which will hamper shipments from the mills for some time.

Temporary conditions are thus apt to have undue weight in estimates of the outlook. While the rate of mill operation is generally better than that of new bookings, expectations of spring demand are now a factor, and it is argued that this should reinforce what have been thus far largely upkeep orders.

Neither in pig iron nor in finished products is there a serious trying out of the higher prices for which producers have lately been standing with more or less firmness. Far forward buying is still the exception; yet some furnaces and some mills are quite well sold through May and meantime prefer to have the situation develop before getting on third quarter ground.

While here and there buyers of pig iron have shown interest in last half deliveries, no new buying movement is expected for some weeks. Pig iron producers, as the result of conferences in various districts, are asking more money, but doing a very moderate business. In the Chicago district malleable pig iron has sold at 25 to 40 cents below the \$14.25 asking price of the furnaces. Northern Ohio and Valley prices are slightly higher, as are those for Buffalo and Eastern irons.

The sales of the Dominion Company's Nova Scotia pig iron in the East have been 15,000 to 20,000 tons, largely to pipe companies, but includ-

ing also some No. 2 foundry iron of 1.5 per cent. phosphorus.

Sales of sheet bars and billets for the second quarter have been considerable. The largest Pittsburgh company is now practically out of the market, and Mahoning Valley interests that have been free sellers at concessions are less of a factor.

The finished material market is almost without feature. A fair amount of structural business is developing in various districts, including a number of hotels in western cities. In railroad bridge work are a 3000-ton contract with the Great Northern and 1400 tons for a drawbridge at Tacoma for the Oregon-Washington Railroad & Navigation Company. The D., L. & W. terminal work at Buffalo will be largely concrete, requiring 5000 tons of bars and the train sheds will take 2500 tons of steel.

In the Central West sales of reinforcing steel bars are reported as low as 1.15c. at mill, meeting prices of makers of hard bars. In spite of the small figure cut in that market by railroads and implement makers, steel bar specifications are still the backbone of mill operations in the leading lines, and some mills are sold ahead for several months.

In late export business is an order for 8500 tons of rails from the Pekin & Kalgan Railway Company.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	Mar. 4, 1914.	Feb. 25, 1914.	Feb. 4, 1914.	Mar. 5, 1913.
<b>Pig Iron, Per Gross Ton:</b>				
No. 2 X, Philadelphia...	\$15.00	\$15.00	\$14.75	\$17.80
No. 2, Valley furnace...	13.25	13.25	13.00	17.00
No. 2 Southern, Cin'ti...	14.00	14.00	13.75	16.50
No. 2, Birmingham, Ala...	10.75	10.75	10.50	13.25
No. 2, furnace, Chicago*	14.25	14.25	14.00	17.25
Basic, del'd, eastern Pa...	<b>14.50</b>	14.25	14.00	18.00
Basic, Valley furnace...	<i>13.00</i>	13.25	13.00	16.25
Bessemer, Pittsburgh...	15.15	15.15	14.90	18.15
Malleable Bess., Ch'go*	<b>14.25</b>	14.00	14.00	17.25
Gray forge Pittsburgh...	13.65	13.65	13.65	17.15
L. S. charcoal, Chicago...	15.25	15.25	15.25	18.00

### Billets, etc., Per Gross Ton:

Bess. billets, Pittsburgh...	21.00	21.00	21.00	28.50
O.-h. billets, Pittsburgh...	21.00	21.00	21.00	29.00
O.-h. sheet bars, P'gh...	22.00	22.00	22.00	29.50
Forging billets, base, P'gh...	25.00	25.00	25.00	36.00
O.-h. billets, Phila...	23.40	23.40	23.40	32.00
Wire rods, Pittsburgh...	26.50	26.50	26.00	30.00

### Old Material, Per Gross Ton:

Iron rails, Chicago...	<i>13.00</i>	13.25	13.00	16.25
Iron rails, Philadelphia...	16.50	16.50	16.50	18.00
Carwheels, Chicago...	12.25	12.25	12.25	16.75
Carwheels, Philadelphia...	12.75	12.75	12.50	15.00
Heavy steel scrap, P'gh...	<i>12.25</i>	12.75	12.25	14.00
Heavy steel scrap, Phila...	<b>11.50</b>	11.00	11.00	12.50
Heavy steel scrap, Ch'go...	<i>10.00</i>	10.25	10.25	12.00
No. 1 cast, Pittsburgh...	17.75	12.00	11.25	15.00
No. 1 cast, Philadelphia...	13.00	13.00	12.50	14.00
No. 1 cast, Ch'go (net ton)	<i>10.50</i>	10.75	10.75	12.50

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.27½	1.27½	1.22½	1.67½
Iron bars, Pittsburgh...	1.40	1.40	1.35	1.70
Iron bars, Chicago...	1.12½	1.12½	1.10	1.57½
Steel bars, Pittsburgh...	1.20	1.20	1.20	1.85
Steel bars, New York...	1.36	1.36	1.36	2.01
Tank plates, Pittsburgh...	1.20	1.20	1.20	1.60
Tank plates, New York...	1.36	1.36	1.36	1.76
Beams, etc., Pittsburgh...	1.20	1.20	1.20	1.70
Beams, etc., New York...	1.36	1.36	1.36	1.86
Skelp, grooved steel, P'gh	1.25	1.25	1.20	1.45
Skelp, sheared steel, P'gh	1.35	1.35	1.30	1.50
Steel hoops, Pittsburgh...	1.30	1.30	1.30	1.60

### Sheets, Nails and Wire,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.95	1.95	1.95	2.35
Galv. sheets, No. 28, P'gh	2.95	2.95	2.95	3.50
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.75
Cut nails, Pittsburgh...	1.65	1.65	1.60	1.70
Fence wire, base, P'gh...	1.40	1.40	1.40	1.55
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.15



**Coke, Connellsville,**

	Mar. 4,	Feb. 25,	Feb. 4,	Mar. 5,
Per Net Ton at Oven:	1914.	1914.	1914.	1913.
Furnace coke, prompt...	\$1.85	\$1.85	\$1.85	\$2.50
Furnace coke, future....	2.00	2.00	2.00	2.50
Foundry coke, prompt...	2.50	2.50	2.50	3.00
Foundry coke, future....	2.75	2.75	2.60	3.00

**Metals,**

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	15.00	15.00	15.00	15.00
Electrolytic copper, N. Y.	14.87½	14.50	14.75	14.87½
Spelter, St. Louis.....	5.15	5.20	5.25	6.20
Spelter, New York.....	5.30	5.35	5.40	6.35
Lead, St. Louis.....	3.87½	3.87½	4.05	4.20
Lead, New York.....	4.00	4.00	4.15	4.35
Tin, New York.....	37.90	38.12½	40.87½	48.50
Antimony, Hallett's, N. Y.	7.00	7.00	7.00	8.62½
Tin plate, 100-lb. box, P'gh.	\$3.30	\$3.30	\$3.25	\$3.60

**Finished Iron and Steel f. o. b. Pittsburgh**

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.20c. to 1.25c. base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zeos, 3 in. and over, 1.20c. to 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

**Wire Products.**—Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples, to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Prices of the foregoing wire products to dealers, in carload lots, are 5c. higher. Woven wire fencing, 74 per cent. off list for carloads; 73 off for 1000-rod lots; 72 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

		Plain Wire, per 100 lb.									
Nos.		0 to 9	10	11	12&12½	13	14	15	16		
Annealed	....	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15		
Galvanized	....	2.05	2.05	2.10	2.15	2.25	2.35	2.75	2.85		

**Wire Rods.**—Bessemer, open-hearth and chain rods, \$26.50 to \$27.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 2, 1914, and iron pipe from June 2, 1913, all full weight:

		Steel.		Butt Weld		Iron.	
Inches.		Black.	Galv.	Inches.		Black.	Galv.
¼, ½ and ¾	...	72½	52	1½ and 1¾	...	66	47
7 to 12	...	76½	66	2	...	65	46
¾ to 3	...	79½	71	2½ to 2½	...	69	56
				7 to 12	...	72	61

		Lap Weld		Reamed and Drifted	
2	...	76½	68	1 to 1½, butt...	70
2½ to 6	...	78½	70	2, butt	70
7 to 12	...	75½	65	1½, lap	54
13 to 15	...	52½	65	1½, lap	65
				2, lap	68
				2½ to 4, lap...	68
				7 to 12	55

		Butt Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
¼, ½ and ¾	...	67½	57	1½	65
7 to 12	...	72½	66	2	67
¾ to 1½	...	76½	70	2½ to 4	70
2 to 3	...	77½	71	4½ to 6	69
				7 and 8	63
				9 to 12	58

		Butt Weld, double extra strong, plain ends		Lap Weld, double extra strong, plain ends	
¼	...	62½	56	1½	65
¾ to 1½	...	65½	59	2	67
2 to 2½	...	67½	61	2½ to 4	70
				4½ to 6	69
				7 and 8	63
				9 to 12	58

		Butt Weld, double extra strong, plain ends		Lap Weld, double extra strong, plain ends	
1½	...	62½	56	1½	65
¾ to 1½	...	65½	59	2	67
2 to 2½	...	67½	61	2½ to 4	70
				4½ to 6	69
				7 and 8	63
				9 to 12	58

		Butt Weld, double extra strong, plain ends		Lap Weld, double extra strong, plain ends	
1½	...	62½	56	1½	65
¾ to 1½	...	65½	59	2	67
2 to 2½	...	67½	61	2½ to 4	70
				4½ to 6	69
				7 and 8	63
				9 to 12	58

		Butt Weld, double extra strong, plain ends		Lap Weld, double extra strong, plain ends	
1½	...	62½	56	1½	65
¾ to 1½	...	65½	59	2	67
2 to 2½	...	67½	61	2½ to 4	70
				4½ to 6	69
				7 and 8	63
				9 to 12	58

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

**Boiler Tubes.**—Discounts to jobbers, in carloads, in effect from January 2, 1914, are as follows:

Lap-Welded Steel		Standard Charcoal Iron	
1½ and 2 in.	61	1½ in.	45
2½ in.	58	1½ and 2 in.	49
2½ and 3 in.	64	2 in.	45
3 and 3½ in.	69	2½ in.	54
3½ and 4½ in.	71	3 and 3½ in.	57
5 and 6 in.	64	3½ and 4½ in.	60
7 to 13 in.	61	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

**Sheets.**—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

		Blue Annealed Sheets	
Nos.			Cents per lb.
3 to 8	...	1.40 to 1.45	
9 to 10	...	1.45 to 1.50	
11 and 12	...	1.50 to 1.60	
13 and 14	...	1.55 to 1.65	
15 and 16	...	1.65 to 1.70	

		Box Annealed Sheets, Cold Rolled	
Nos.			Cents per lb.
10 and 11	...	1.60 to 1.65	
12	...	1.60 to 1.65	
13 and 14	...	1.65 to 1.70	
15 and 16	...	1.70 to 1.75	
17 to 21	...	1.75 to 1.80	
22 and 24	...	1.80 to 1.85	
25 and 26	...	1.85 to 1.90	
27	...	1.90 to 1.95	
28	...	1.95 to 2.00	
29	...	2.00 to 2.05	
30	...	2.10 to 2.15	

## Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.95 to 2.00
No. 12.....	2.05 to 2.10
Nos. 13 and 14.....	2.05 to 2.10
Nos. 15 and 16.....	2.20 to 2.25
Nos. 17 to 21.....	2.35 to 2.40
Nos. 22 and 24.....	2.50 to 2.55
Nos. 25 and 26.....	2.65 to 2.70
No. 27.....	2.80 to 2.85
No. 28.....	2.95 to 3.00
No. 29.....	3.10 to 3.15
No. 30.....	3.25 to 3.30

## Chicago

CHICAGO, ILL., March 2, 1914.

The buying of rails and the placing of orders for cars are necessary to the establishing of the mills on a sound operating basis. Until such business develops in more nearly normal volume, structural, bar and plate tonnage from other sources will be too eagerly sought to admit of much higher prices. The ordinary sheared plate business is being done on the basis of 1.38c., Chicago; steel bars at 1.38c. to 1.43c., and structural shapes at 1.43c. Specifications in these principal lines, and including sheets, aggregated larger totals in February than in January. Shipments from the mills of the largest interest approximated 200,000 tons in the four weeks of last month. But new business is not coming out at a rate that promises any increase in this activity, while perhaps the most optimistic estimate that has been ventured by a Western mill is the statement that orders now on the books will carry through March and April. Some of the brighter aspects of the situation are reflected in the mild rush to cover a number of hotel and other building projects with tenders for the steel construction and also in the proportion of tonnage balances that are being specified, March 1, against contracts expiring April 1. In the foundry trade a slight improvement is reported by makers of malleable castings and by the steel foundries that depend upon general rather than railroad work, but gray iron founders have very little new business in sight. Pig-iron inquiry has dropped off sharply. Old material is being quoted at prices averaging 50c. a ton below the levels of a week ago.

**Pig Iron.**—The purchase of 4000 tons of malleable iron by a Chicago melter a week ago is understood to have been made at \$14.20, delivered, equivalent to \$13.85 at Chicago furnace. Such other quotations as have been noted indicate that the above price is below the prevailing market. For foundry and malleable Bessemer iron, local furnaces are said to be making no concessions from the \$14.25 basis. The Southern iron market has also come through the week without change, certain standard grades being still available on the basis of \$10.75, with the more common quotation of \$11 obtaining for other brands. The amount of business being offered is hardly sufficient to prove a temptation, and inquiry for both prompt shipment and forward delivery is limited and scattering. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4.....	\$15.25 to \$15.75
Northern coke foundry, No. 1.....	14.75 to 15.00
Northern coke foundry, No. 2.....	14.25 to 14.75
Northern coke foundry, No. 3.....	14.00 to 14.25
Southern coke No. 1 f'dry and 1 soft.....	15.60 to 16.10
Southern coke, No. 2 f'dry and 2 soft.....	15.10 to 15.60
Southern coke, No. 3.....	14.60 to 15.10
Southern coke, No. 4.....	14.10 to 14.60
Southern gray forge.....	13.85 to 14.35
Southern mottled.....	13.35 to 13.85
Malleable Bessemer.....	14.25 to 14.50
Standard Bessemer.....	16.50
Basic.....	13.50 to 14.00
Jackson Co. and Kentucky silvery, 6 per cent.....	16.90
Jackson Co. and Kentucky silvery, 8 per cent.....	17.90
Jackson Co. and Kentucky silvery, 10 per cent.....	18.90

**Rails and Track Supplies.**—The distribution of the 15,000 tons of Great Northern rails is again interesting in that it allots 3000 tons to the Pennsylvania Steel Company despite the handicap of freight disadvantage under which that company labors. Of the remainder 3000 tons was placed with the Cambria Steel Company and 9000 tons with the Illinois Steel Company. Rail tonnage is the particular need of the present mill situa-

tion. An approximately correct estimate of rail shipments from Western mill in February would not place the tonnage at more than 10 per cent. of the total. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2.05c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$27 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—Plans for three hotels at Chicago and one at Kansas City, the expected cost of which totals \$1,750,000, are being presented for figures on the structural steel with a noticeable show of haste. Bids have been submitted at Chicago on the Memphis bridge, alternate plans for which call for 20,000 or 22,000 tons. Tenders have been received on preliminary plans for the Lumberman's Exchange building at Chicago for which between 3000 and 4000 tons will be required. In short, there is in sight for the fabricator a very encouraging tonnage in new work. For the present, fabricating shops are only fairly busy and contracts closed last week totaled about 3700 tons. This includes 1500 tons of bridge steel for the Great Northern and 362 tons for the plant additions of the Hamilton Mfg. Company at Two Rivers, Wis., taken by the Wisconsin Bridge Company; 1352 tons for the Missabe coal dock at Duluth, placed with the American Bridge Company; 368 tons to the Mosher Mfg. Company for the Nieman-Marcus Company at Dallas, Tex., and 118 tons for the Curtis Sash & Door Company, Chicago, to be furnished by the Hansell-Elcock Company. Structural tonnage on the books of the mills is exceeded only by bar orders, and with respect to prices the mills are able to maintain their position more rigidly here than in any other line. We quote for Chicago delivery, from mill, 1.43c. to 1.48c.

Aside from some increase in the tonnage of single orders, structural trade out of store presents no changes of consequence. We quote for Chicago delivery, from stock, 1.75c.

**Plates.**—Mills report a slight increase in sheared plate tonnage. For the going business, 1.38c., Chicago, is the market price and for the less desirable specifications, slight advances are asked. Quotations are for shipments in the second quarter. That these quotations can be maintained, even for large tonnages, is doubtful. Pending car business includes the taking of figures on 1500 for the Denver & Rio Grande, 1600 for the Texas & Pacific, of which 1000 are gondolas, and from 1000 to 2000 for the St. Louis & Southwestern. We quote for Chicago delivery, from mill, 1.33c. to 1.38c.

For Chicago delivery, from store, we quote 1.75c.

**Sheets.**—Contract tonnage in sheets is sufficiently satisfactory to the mills to leave no question as to the firm maintenance of the current prices. The dividing line between plates and sheets, which involves the heavier blue annealed sheets to some extent, develops an occasional soft spot, but this is scarcely significant. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.63c.; No. 28 black, 2.18c.; No. 28 galvanized, 3.18c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

**Bars.**—Despite the lack of participation on the part of the railroads and agricultural implement manufacturers, steel-bar specifications constitute the back bone of mill operations. Bar-iron tonnage also shows a small increase and a corresponding advance in quotations. Reinforced concrete construction, projected for the spring building season, is the occasion for active campaigning for reinforcing bar business. With the implement demand very light, new business in sight for hard steel is declining. We quote for mill shipments as follows: Bar iron, 1.12½c. to 1.17½c.; soft steel bars, 1.38c. to 1.43c.; hard steel bars, 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base,



with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting 57 per cent. off.

**Rivets and Bolts.**—A few orders for bolts from the railroads constitute the only recent break in the routine of small orders from jobbers and the general manufacturing trade. Implement and wagon makers are buying very lightly. The demand for rivets is dull. We quote from mill as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets,  $\frac{1}{2}$  to  $1\frac{1}{4}$  in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Local jobbers have made a slight advance in their price of bolts. We quote out of store: Structural rivets, 2.40c.; boiler rivets, 2.60c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to  $\frac{3}{4}$  x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, \$6.00, and hexagon, \$6.70 off per cwt.

**Cast-Iron Pipe.**—The most important tonnage in sight for the cast-pipe foundries is the proposed purchase of 10,000 tons at Detroit, bids for which will be received March 10. This week Ft. Wayne, Ind., is taking prices on 300 tons, and March 9 350 tons will be placed at Battle Creek, Mich. The lettings of the week included 1000 tons at Evansville, Ind., awarded to the leading interest, and 600 tons at Dayton, Ohio, for which the same company was low bidder; also, 300 tons each at Saginaw, Mich., and Elyria, Ohio, both of which were taken by the Massillon Iron & Steel Company. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$27; 6 to 12 in., \$25; 16 in. and up, \$24, with \$1 extra for gas pipe.

**Old Material.**—Melters of scrap are showing very little interest in the market, and only bargains appeal. Transactions of the past several days have been limited to carload and similar lots of a few hundred tons. The principal user of heavy melting steel is out of the market, while demand from Eastern consumers, upon which much of the local strength has depended, is declining. Scrap prices are accordingly lower. The appearance of 500 tons of cast scrap and 1000 tons of steel rails on the list from the Chicago & Northwestern will have a further depressing influence on those grades. In addition to the 4500 tons on this list, the Wabash is offering 1200 tons. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails .....	\$13.00 to \$13.50
Old steel rails, rerolling .....	11.75 to 12.25
Old steel rails, less than 3 ft. ....	11.25 to 11.75
Relaying rails, standard section, sub- ject to inspection .....	24.00
Old carwheels .....	12.25 to 12.75
Heavy melting steel scrap .....	10.00 to 10.50
Frogs, switches and guards, cut apart ..	10.00 to 10.50
Shoveling steel .....	9.50 to 10.00
Steel axle turnings .....	7.25 to 7.75

Per Net Ton	
Iron angles and splice bars .....	\$12.75 to \$13.25
Iron arch bars and transoms .....	12.75 to 13.25
Steel angle bars .....	9.50 to 10.00
Iron car axles .....	18.00 to 18.50
Steel car axles .....	12.75 to 13.25
No. 1 railroad wrought .....	9.25 to 9.75
No. 2 railroad wrought .....	8.75 to 9.00
Cut forge .....	8.75 to 9.00
Steel knuckles and couplers .....	9.25 to 9.75
Steel springs .....	10.00 to 10.50
Locomotive tires, smooth .....	10.25 to 10.75
Machine shop turnings .....	5.00 to 5.50
Cast borings .....	4.75 to 5.25
No. 1 busheling .....	8.00 to 8.50
No. 2 busheling .....	6.25 to 6.75
No. 1 boilers, cut to sheets and rings ..	6.50 to 7.00
Boiler punchings .....	9.25 to 9.75
No. 1 cast scrap .....	10.50 to 11.00
Stove plate and light cast scrap .....	9.75 to 10.25
Grate bars .....	9.50 to 10.00
Railroad malleable .....	9.75 to 10.25
Agricultural malleable .....	9.00 to 9.50
Pipes and flues .....	7.00 to 7.50

**Wire Products.**—The seasonable and customary handicap of February weather had its effect upon the general movement of wire products, reducing the tonnage for the month. The natural tendency toward lighter business was offset in a measure by liberal specifications against expiring contracts. A sustained activity in fencing was also a favorable influence.

Quotations remain firm at the recent advance, in the absence of any real test of their strength. We quote to jobbers as follows: Plain wire No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.13, all Chicago.

## Cleveland

CLEVELAND, OHIO, March 3, 1914.

**Iron Ore.**—While it is expected that it will be several weeks before the buying movement begins, the price situation is attracting a little more attention among ore sellers and furnacemen. While sellers generally are opposed to a sharp cut in prices, some one interest will probably establish prices by starting to make sales and others will fall into line as has been done the past two or three seasons. The opinion is expressed in some quarters that, owing to the light demand, the market will be more open this year than in previous seasons. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

**Pig Iron.**—The market is dull, but prices are firm. Cleveland furnaces are adhering to their recent advance to \$14 at furnace for No. 2 foundry, but are not making sales at the advance. A few small inquiries are coming out, but buyers so far are unwilling to pay the higher prices, so that the advance has checked buying. Foundries are generally covered by contracts for their first half requirements at their present rate of consumption so that little additional iron will have to be purchased for delivery before July, unless the foundry business improves. In the Valley the market is firm, most producers holding to \$13.50 for No. 2. This price, however, could probably be shaded for a round lot. Outside of the immediate territory inquiry has improved somewhat for foundry and malleable grades. Some inquiry has come out for lots up to 4000 tons for delivery partly before the second quarter, but mostly for the last half. Orders have not yet developed to indicate whether buyers are willing to pay an advance of 50c. a ton asked for last half. Southern iron is very quiet, with \$10.75, Birmingham, as the minimum quotation and most producers asking \$11. Ohio silvery has stiffened up 25c. to \$16 at furnace for 8 per cent., but this price is being quoted for the remainder of the year and a few small lots have been sold for that delivery. We quote, f.o.b. Cleveland, as follows:

Bessemer .....	\$15.15
Basic .....	14.00
Northern No. 2 foundry .....	14.25
Southern No. 2 foundry .....	\$15.10 to 15.35
Gray forge .....	13.50
Jackson Co. silvery, 8 per cent. silicon .....	17.55

**Coke.**—The market is quiet, with most makers of furnace coke holding to \$2. A Cleveland furnace interest has just bought 8000 tons of good quality coke for spot shipment at \$1.75 at oven, this being the price at which the same consumer has made a number of previous purchases. We quote standard foundry coke at \$2.40 to \$2.65 per net ton at oven.

**Finished Iron and Steel.**—Inquiry has fallen off considerably, but there is a fair volume of specifications. There is little change in the price situation. Steel bars, plates and structural material are quoted at 1.20c. to 1.25c., Pittsburgh, and mills are able to get the higher price for small lots. However, the 1.20c. price has been shaded for round lots of steel bars for reinforcing purposes. It is reported that on some desirable business one mill has met the 1.15c. price quoted by makers of hard steel bars. There is a moderate demand for steel bars for reinforcing work, but inquiry for structural material is light. A fair amount of small work coming out, the material for which fabricators will take out of their stocks. The Variety Iron Works Company, Cleveland, has taken 560 tons of plate work from the foundation for the Lincoln Memorial in Washington. The demand for sheets is not active. Most mills are adhering to 1.90c. for No. 28 black and 2.90c. for No. 28 galvanized as their minimum quotations. The demand



for iron bars continues inactive, with the price unchanged at 1.20c., Cleveland. Stock prices are unchanged at 1.80c. for steel bars and 1.90c. for plates and structural material.

**Bolts and Rivets.**—The demand for bolts and nuts is holding up well and prices are firm. Rivets are very quiet, with prices unchanged at 1.65c. for structural and 1.75c. for boiler. We quote mill discounts as follows: Common carriage bolts,  $\frac{3}{8}$  x 6 in. smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts,  $\frac{3}{8}$  x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon,  $\frac{3}{8}$  in. and larger, \$7.20 off; 9/16-in. and smaller, \$7.80 off; semi-finished hexagon nuts,  $\frac{3}{8}$  in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

**Old Material.**—The market is dull and prices are weak. Quotations on turnings, borings and busheling scrap have been reduced 25c. to 50c. a ton. A local mill continues to offer \$11 for heavy melting steel, and Valley mills are reported to be offering \$12.25 to \$12.50 for the same grade. Local mills are well filled up on busheling, and shipments are being held back. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling.....	\$12.00 to \$12.50
Old iron rails .....	13.50 to 14.00
Steel car axles .....	16.00 to 16.25
Heavy melting steel .....	10.75 to 11.25
Old car wheels .....	12.00 to 12.50
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable .....	9.00 to 9.50
Railroad malleable .....	11.50 to 11.75
Light bundled sheet scrap.....	7.00 to 7.50
Bundled tin scrap .....	11.00 to 11.50
Per Net Ton	
Iron car axles .....	\$20.00 to \$21.00
Cast borings .....	6.50 to 6.75
Iron and steel turnings and drillings.....	5.75 to 6.25
Steel axle turnings .....	7.00 to 7.50
No. 1 busheling, new.....	9.50 to 9.75
No. 1 busheling, old.....	8.75 to 9.00
No. 1 railroad wrought .....	11.00 to 11.50
No. 1 cast .....	11.50 to 11.75
Stove plate .....	9.00 to 9.25

## Philadelphia

PHILADELPHIA, PA., March 3, 1914.

The market has been somewhat quieter, as was to be expected, following the recent heavy buying movement. In a number of lines February orders made a very good showing. In the pig-iron market the announcement of arrangements for the importation of Nova Scotia pig iron for delivery in this district has been a feature but the movement so far is largely experimental. Small sales rule in foundry grades while steel-making irons are less active. The finished material situation shows little change, although a better feeling in connection with structural material is noted. Billets have been rather quiet. In the lighter lines the demand has been largely for early deliveries. Coke is firm and reported scarcer. Sales of heavy melting steel at higher prices are noted, but the market generally shows little change.

**Iron Ore.**—The market is practically at a standstill.

**Pig Iron.**—The trade has been much interested in the placing of contracts for Nova Scotia pig iron for delivery in this district. Rogers, Brown & Co., selling representatives of the Dominion Iron & Steel Company, state that sales of about 15,000 tons have been made for delivery to two Delaware River cast-iron pipe makers. While it has been stated that the price was \$13.50 on dock, the delivered price will range close to \$13.75. Plans are under way for bringing in higher foundry grades, at about \$15 delivered at nearby points, but as freight rates to various consuming points have not yet been established definite quotations have not been made. The present proposition is to bring down a cargo a month during the season of navigation. So far, the importation of Nova Scotia iron is considered as being largely of an experimental nature. The general movement in pig iron in this district has been somewhat lighter. Many large consumers have covered

for the near future, and buying is now confined to a larger extent to melters who customarily order from month to month. Few sales in excess of 200 to 300 tons have been reported. A moderate amount of new inquiry for small lots is noted with some few larger tonnages for extended delivery. The inquiry for 3000 tons for the Baldwin Locomotive Works is still unclosed. A New Jersey melter is out for 900 tons of No. 1 X and 900 tons of No. 2 plain for second quarter delivery. An upper Delaware River cast-iron pipe maker is inquiring for 15,000 tons for second half, but few producers in this district are willing to sell so far ahead. A soil-pipe maker is also reported in the market for a round lot of second half iron. Prices of standard brands of eastern Pennsylvania foundry iron are being comparatively well maintained. For early shipment \$15, delivered, appears to be the minimum. In most cases \$15.50 is named for second quarter delivery. There has been a moderate movement in Virginia irons. Some producers continue to make fair sales for early delivery at \$12.75 to \$13 at furnace for No. 2 X, while the leading interest quotes \$13.25 for second quarter shipment. Sales of No. 1 X foundry for early shipment have been made at \$13.25. Little movement in rolling-mill forge iron has developed. Steel-making grades are quieter. Basic consumers are pretty well covered and no fresh demand has come out. Moderate sales of standard analysis low-phosphorus iron continue to be made at \$21 delivered. Pig-iron producers in this district are in a more comfortable position as to the volume of business on their books, and are disposed to hold current prices. While definite quotations for extended delivery are not frequently made, materially higher prices for such delivery are contemplated. For delivery over the next few months in buyers' yards in this district, the following quotations are named:

Eastern Penna. No. 2 X foundry....	\$15.00 to \$15.50
Eastern Penna. No. 2 plain.....	14.75 to 15.25
Virginia No. 2 X foundry.....	15.55 to 16.00
Virginia No. 2 plain .....	15.55 to 16.00
Gray forge .....	14.00
Basic .....	14.50
Standard low phosphorus .....	21.00

**Ferroalloys.**—New business has been comparatively light. Small inquiries for prompt ferromanganese are noted, with sales at \$39, seaboard, for English 80 per cent. For extended delivery \$40 is named. German ferromanganese, for prompt delivery, is still reported available at \$38, seaboard.

**Billets.**—New business, particularly for large tonnages, comes out slowly. Some mills report fair orders for small quantities. Recently specifications against contracts have been comparatively good, and mill operations have been well maintained. Prices appear firm at \$23.40 to \$24.40 delivered here for basic open-hearth rolling steel. Forging billets command an advance of \$4 to \$5 a ton over rolling billets, according to specification.

**Plates.**—Eastern mills continue to receive a good run of business, both in miscellaneous material and small contracts for delivery up to the end of the first half. In instances orders have been in excess of the current make and some mills are operating close to 90 per cent. of capacity. One order for 1800 tons of plates for structural work has been entered at full prices. An inquiry is out for 300 tons for a ferry boat. Makers are encouraged with the outlook, but so far have not been able to advance prices, which remain at 1.35c. to 1.40c. for ordinary current business, delivered in this district.

**Structural Material.**—Not much new business has developed, but some of the pending negotiations have been closed. It is stated that the Widener Building, 9000 to 10,000 tons, has gone to the leading interest. Contracts are also reported closed for 900 tons for use in the electrification of the main line of the Pennsylvania Railroad. Little new bridge work has come out in this district. Miscellaneous business in plain shapes is fair. Some mills have been more or less inconvenienced by unfavorable weather conditions. Prices of plain shapes are pretty well maintained at 1.35c. to 1.40c., delivered here.

**Bars.**—The demand for both iron and steel bars has been somewhat light. Current sales have been mostly in small lots for early delivery. Specifications on con-

tracts continued fair. Prices are unchanged, ordinary iron bars ranging from 1.27½c. to 1.32½c. delivered with the better grades commanding up to 1.35c. Steel bars are unchanged at 1.35c. to 1.40c. here.

**Sheets.**—Current business has been mainly in small lots for early delivery. Mill operations are about as they have been. Prices are unchanged but firm at 1.55c. to 1.60c. for No. 10 blue annealed sheets, delivered in this vicinity.

**Coke.**—While there has not been much movement in this district, offerings are not so freely made and prices have a harder tendency. Considerable furnace coke business is pending and good brands for forward shipment are scarce at \$2 at oven, and in instances \$2.25 is asked. Prompt furnace coke is available at \$1.90 to \$2 at oven. Foundry coke has a quieter tendency. For delivery in buyers' yards, in this district, the following range of prices is named:

Connellsville furnace coke.....	\$3.90 to \$4.40
Connellsville foundry coke .....	4.80 to 5.15
Mountain furnace coke .....	3.60 to 4.10
Mountain foundry coke .....	4.50 to 4.85

**Old Material.**—The market generally has been quieter. Reports are current that one Eastern steel maker paid \$12 delivered for a round lot of No. 1 heavy melting steel. Little business has been moving in other grades. Borings and turnings are weaker, due to heavier offerings. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Old steel rails, rerolling.....	13.50 to 14.00
Low phosphorus heavy melting steel	
scrap (nominal) .....	14.50 to 15.00
Old steel axles .....	17.00 to 17.50
Old iron axles .....	23.00 to 24.00
Old iron rails .....	16.50 to 17.00
Old carwheels .....	12.75 to 13.25
No. 1 railroad wrought .....	14.50 to 15.00
Wrought-iron pipe .....	11.00 to 11.50
No. 1 forge fire .....	10.00 to 10.50
Bundled sheets .....	10.00 to 10.50
No. 2 light iron (nominal).....	5.00
No. 2 busheling (nominal).....	8.50 to 9.00
Wrought turnings .....	9.00 to 9.50
Cast borings .....	9.00 to 9.50
Machinery cast .....	13.00 to 13.50
Grate bars, railroad.....	9.50 to 10.00
Stove plate .....	10.00 to 10.50
Railroad malleable .....	10.00 to 10.50

## Pittsburgh

PITTSBURGH, PA., March 4, 1914.—(By Wire.)

The steel business has been practically snowed under the past week and there are no new developments. New orders continue to show a falling off and buyers are well covered for March and in some cases through second quarter. All out door work is shut off, and consumption of iron and steel is greatly decreased. A good buying movement is looked for late this month or early in April when the spring trade should open up. Prices on basic pig iron are weaker and slightly lower and scrap is off from 50 cents to \$1 a ton. Coke is quiet but steady.

**Pig Iron.**—The market continues very dull and there is practically no inquiry for Bessemer, basic or foundry iron. W. P. Snyder & Co. report the average price of basic in February as \$13.059, and Bessemer iron \$14.225. Sales of about 60,000 tons of basic iron are reported, of which the Youngstown Sheet & Tube Company bought in February nearly 50,000 tons from the Ohio Iron & Steel Company at \$13 at furnace. The Pittsburgh Steel Foundries Company has bought 500 tons of basic at \$13 or less, Valley furnace. The basic market is weaker, and on a large tonnage, possibly \$13 at Valley furnace might be paid. We quote Bessemer, \$14.25; basic, \$13; No. 2 foundry, \$13.25 to \$13.50; gray forge, \$12.75 to \$13; malleable Bessemer, \$13.50 to \$13.75 for delivery through first half of this year, all at Valley furnace, the freight rate to the Pittsburgh or Cleveland district being 90c. a ton.

**Billets and Sheet Bars.**—The billets and rail sales bureau of the Carnegie Steel Company entered orders and sent to the mills for rolling about 24,000 tons more of rails, billets and sheet bars in February than in Jan-

uary, in spite of the fact there were 3 days less in February than in January, besides two holidays. Practically no new orders for billets or sheet bars are being placed, as consumers are covered ahead on contracts. We quote Bessemer and open-hearth billets at \$21 and Bessemer and open-hearth sheet bars at \$22, f.o.b. makers' mills, Pittsburgh or Youngstown, for the rest of this quarter. We quote forging billets at \$25 on desirable specifications, embracing only one size, and up to and including 10 x 10 in., the regular extras being charged for larger sizes. On small orders, forging billets are held at \$26. We quote axle billets at \$23 for desirable orders and \$24 for small orders.

**Muck Bar.**—The local market is dull and there is no fresh inquiry. We quote best grades, made from all pig iron, at \$28.50 to \$29, delivered to consumers' mills in the Pittsburgh district. Eastern muck bar, in which part scrap is used, is being offered at \$26.50 to \$27 delivered.

**Steel Rails.**—The Carnegie Steel Company is entering a fair amount of orders for standard sections, but is not receiving any large contracts. Light rails are in active demand, and the Carnegie Steel Company received last week new orders and specifications for about three thousand tons. We quote splice bars at 1.50c. and standard section rails at 1.25c. Light rails, rolled from billets, are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

**Wire Rods.**—Inquiry is dull but prices are fairly steady. We quote Bessemer, open-hearth and chain rods at \$26.50 to \$27, Pittsburgh.

**Skelp.**—There is a fair amount of new inquiry and the skelp mills are pretty well filled up over the next two months or more. Prices are firm. We quote: Grooved steel skelp, 1.25c. to 1.30c.; sheared steel skelp, 1.35c. to 1.40c.; grooved iron skelp, 1.65c. to 1.70c.; sheared iron skelp, 1.70c. to 1.75c., delivered to consumers' mills in the Pittsburgh district.

**Plates.**—The Virginia & Southwestern has placed 535 steel gondola cars with the Pressed Steel Car Company in addition to the order for 400 placed some time ago. The Cambria Steel Company has taken 1000 steel hopper cars for the Philadelphia & Reading and the Hockensmith Wheel & Mine Car Company, Irwin, Pa., has taken 300 mine cars for the Clearfield Coal Corporation. The St. Louis & Southwestern Railroad has an inquiry out for 1000 box cars, 400 flat cars and 1000 steel gondolas. The Buffalo, Rochester & Pittsburgh will probably buy 1000 more steel hopper cars. The demand for both sheared and grooved plates is quiet and none of the plate mills is running full. We quote ¼-in. and heavier plates at 1.20c. on desirable orders for prompt shipment and 1.25c. for delivery in second quarter, f.o.b. Pittsburgh.

**Iron and Steel Bars.**—Two local makers of steel bars report that specifications in February were heavier than in January. The new demand is fair, but most consumers are covered for March and some of the largest through second quarter. The demand for reinforcing steel bars is heavy. We quote steel bars for prompt shipment at 1.20c. to 1.25c., the latter price for delivery in second quarter; iron bars, 1.40c. to 1.45c., f.o.b. maker's mill, Pittsburgh. Extras for twisting reinforcing bars over the base price are as follows: ¾ in. and over, \$1; ½ to 11/16 in., \$1.50; under ½ in., \$2.50 per ton. These extras are charged by mills that roll bars from billets, but those rolling bars from old rails are not so strict.

**Structural Material.**—No important contracts have been taken by local fabricators. The steel for the new telephone building in this city, about 3500 tons, has not been placed. We quote beams and channels up to 15 in. at 1.25c., f.o.b. Pittsburgh, but on a very desirable tonnage for prompt shipment 1.20c. could be done. On small lots as high as 1.30c. is being asked.

**Sheets.**—The demand is not heavy, most consumers being covered for this month and some through second quarter. Some makers are taking contracts for second



quarter delivery on the basis of 2c. for No. 28 black and 3c. for No. 28 galvanized. An advance in the price of sheets is looked for this month. For March delivery we quote No. 28 Bessemer black sheets at 1.95c. to 2c.; No. 28 galvanized, 2.95c. to 3c.; Nos. 9 and 10 blue annealed sheets, 1.45c.; No. 28 tin mill black plate, H. R. and A., 1.90c. to 1.95c.; Nos. 29 and 30, 1.95c. to 2c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

**Tin Plate.**—New business is quiet, but shipments by the mills on contracts are heavy. The American Sheet & Tin Plate Company is operating this week to 92 per cent. of its hot tin mill capacity, and others report they are running full. We quote 100-lb. cokes at \$3.30 to \$3.40 and 100 lb. ternes \$3.20 to \$3.30, per base box, f.o.b. Pittsburgh.

**Wire Products.**—While current demand is dull, a heavy trade is looked for early in April, when spring business opens up. We quote: Wire nails, \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all per 100 lb. f.o.b., Pittsburgh, with actual freight charge to point of delivery, terms being 30 days net less 2 per cent. off for cash in 10 days. We quote cut nails at \$1.60 to \$1.65, f.o.b. Pittsburgh. Discounts on woven wire fencing are 74 per cent. off in carload lots, 73 per cent. off on 1000-rod lots and 72 per cent. on less than 1000-rod lots, all f.o.b. Pittsburgh.

**Spikes.**—No large contracts have been placed since the Baltimore & Ohio order for 30,000 kegs, which was taken by the Jones & Laughlin Steel Company. Inquiry is only fair. We quote standard sizes of railroad spikes in large lots at \$1.45 to \$1.50 and small railroad and boat spikes at \$1.55 to \$1.60 per 100 lb., f.o.b. Pittsburgh.

**Hoops and Bands.**—Orders are light, as nearly all consumers are covered up to July. We quote steel bands at 1.20 to 1.25c., the lower price being for prompt shipment, with extras as per the steel bar card, and steel hoops at 1.30c., f.o.b. Pittsburgh.

**Shafting.**—Consumers are well covered and new demand is quiet. We quote cold-rolled shafting in carload and larger lots at 63 to 64 per cent. and in small lots from 60 to 62 per cent. off delivered in base territory, depending on the order.

**Nuts, Bolts and Rivets.**—New business is quiet, consumers being covered over the next 60 to 90 days. We quote button-head structural rivets at \$1.65 to \$1.70 and cone-head boiler rivets at \$1.75 to \$1.80, in carload lots, an advance of \$2 to \$3 a ton over these prices being charged for small lots, depending on the order. Terms are 30 days net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of makers' works:

Cone and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blanked and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.p.c. and r sq. nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts, 1/2 and larger.....	\$7.20 off list
Hexagon nuts, smaller than 9/16.....	\$7.20 off list
C.p. plain square nuts.....	\$7.80 off list
C.p. plain hexagon nuts.....	\$5.50 off list
Semi-fin. hex. nuts, 1/2 and larger.....	85 and 5% off
Semi-fin. hex. nuts, smaller than 9/16.....	85, 10 & 10% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	80, 10 & 5% off
Rivets, metallic tinned, bulk.....	80, 10 and 5% off
Rivets, tin plated, bulk.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set screws.....	75, 10 and 10% off

**Merchant Steel.**—A leading maker reports shipments in February to have been heavier than at any time since early last summer. Jobbers and consumers are pretty well covered, and specifications are heavy. We quote: Iron finished tire, 1/2 x 1 1/2 in. and larger, 1.35c., base; under 1/2 x 1 1/2 in., 1.50c.; planished tire, 1.55c.; channel tire, 3/4 to 7/8 and 1 in., 1.85c. to 1.95c.; 1 1/4 in.

and larger, 1.95c.; toe calk, 1.95c. to 2.05c., base; flat sleigh shoe, 1.70c.; concave and convex, 1.75c.; cutter shoe, tapered or bent, 2.25c. to 2.35c.; spring steel, 1.95c. to 2.05c.; machinery steel, smooth finish, 1.80c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

**Standard Pipe.**—The cold weather and heavy snows have checked the demand. Two leading pipe mills report that actual orders entered in February were heavier than in January. Outside work has stopped and the demand for line pipe and oil-well supplies will be quiet over the next month or more. Prices are quoted elsewhere.

**Boiler Tubes.**—Locomotive and boiler shops are not very busy and as a result the demand for boiler tubes is quiet. It is said that discounts are being shaded to some extent.

**Ferroalloys.**—Nearly all consumers being well covered ahead, the demand is very quiet. The Carnegie Steel Company is holding 80 per cent. domestic ferromanganese at \$42, Pittsburgh, but is not selling any. We quote foreign 80 per cent. ferromanganese at \$39, Baltimore, with a freight rate to Pittsburgh of \$2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$20; 11 per cent., \$21, and 12 per cent., \$22, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12 1/2c. in less than 2000-lb. lots.

**Coke.**—A large Eastern steel company is figuring on the purchase of 10,000 tons of coke per month for four months, commencing April. This consumer bought recently 10,000 tons of standard furnace coke for March delivery at \$2 per net ton at oven. Shipments have been greatly retarded by the heavy snows and cold weather. The quotation in this report last week of \$2 per net ton on 72-hour foundry coke was a typographical error, and should have read \$2.50. We quote strictly standard furnace coke for March shipment at \$2 per net ton at oven. Other grades of furnace coke not so high in quality can be had at \$1.75 up to \$1.85 per net ton at oven. We quote strictly standard foundry coke at \$2.50 per net ton at oven to consumers, but some grades are selling at \$2.30 to \$2.35 at oven.

**Old Material.**—There has been a heavy decline in prices on nearly all grades of scrap. The demand is very dull, most consumers being covered and out of the market. We note sales of 500 tons of low phosphorus scrap at \$15.50; 500 tons of turnings at \$8.50, and 1000 tons of heavy steel scrap at \$12.75, all delivered at consumers' mills. Dealers are quoting as follows per gross ton for delivery in the Pittsburgh and other near-by districts:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery.....	\$12.25 to \$12.50
Compressed side and end sheet scrap.....	11.00 to 11.25
No. 1 foundry cast.....	11.75 to 12.00
No. 2 foundry cast.....	10.50 to 10.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district.....	9.00 to 9.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.....	13.50 to 13.75
No. 1 railroad malleable stock.....	11.25 to 11.50
Grate bars.....	8.00 to 8.25
Low phosphorus melting stock.....	15.50
Iron car axles.....	24.25 to 24.75
Steel car axles.....	17.25 to 17.50
Locomotive axles, steel.....	21.25 to 22.50
Locomotive axles, iron.....	25.25 to 25.75
No. 1 busheling scrap.....	11.25 to 11.50
No. 2 busheling scrap.....	7.50 to 7.75
*Machine shop turnings.....	8.25 to 8.50
Old carwheels.....	11.75 to 12.00
*Cast-iron borings.....	8.75 to 9.00
†Sheet bar crop ends.....	12.75 to 13.00
Old iron rails.....	14.25 to 14.50
No. 1 railroad wrought scrap.....	13.50 to 13.75
Heavy steel axle turnings.....	9.75 to 10.00
Stove plate.....	8.00 to 8.25

\*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.



## Boston

BOSTON, MASS., March 3, 1914.

**Old Material.**—The dealers are out of touch with the Philadelphia market because of much delayed mail and interrupted telegraph and telephone communication. Their views are, therefore, wholly local. The general opinion is that the bearish tendency noted a week ago is largely superficial, and that as soon as the yards are free of snowdrifts the movement of scrap will increase decidedly. Prices have not changed—in fact, little basis exists as to actual market values. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel.....	\$8.75 to \$9.00
Low phosphorus steel.....	13.75 to 14.75
Old steel axles.....	13.25 to 13.75
Old iron axles.....	21.25 to 21.75
Mixed shafting.....	12.75 to 13.00
No. 1 wrought and soft steel.....	9.00 to 9.25
Skeleton (bundled).....	6.00 to 6.50
Wrought-iron pipe.....	8.25 to 8.50
Cotton ties (bundled).....	7.25 to 7.75
No. 2 light.....	3.75 to 4.25
Wrought turnings.....	5.50 to 6.00
Cast borings.....	5.75 to 6.25
Machinery, cast.....	11.25 to 11.50
Malleable.....	8.00 to 8.25
Stove plate.....	7.75 to 8.00
Grate bars.....	6.25 to 6.50
Cast-iron carwheels.....	11.00 to 11.25

## Buffalo

BUFFALO, N. Y., March 3, 1914.

**Pig Iron.**—There is a steady demand for early delivery in small and moderate tonnages, with indications that considerable buying for more extended delivery will develop as the Spring season opens. About 12,000 tons of all grades have been placed in the week. Prices have stiffened further, and there is now practically no iron procurable at less than \$13 per ton, except, perhaps, some low grade or off-grade product. Some charcoal iron, in the hands of middlemen, was reported as disposed of at figures slightly below the schedule; but the demand for charcoal iron has been such that the price has been advanced, along with other lines. At present furnaces are not inclined to consider contracts for last half business, restricting their selling to prompt and second quarter shipment. We quote as follows, for prompt and first half delivery, f. o. b. furnace:

No. 1 foundry.....	\$13.50 to \$14.00
No. 2 X foundry.....	13.25 to 13.50
No. 2 plain.....	13.00 to 13.25
No. 3 foundry.....	13.00 to 13.25
Gray forge.....	12.75 to 13.00
Malleable.....	13.25 to 13.50
Basic.....	13.50 to 14.00
Charcoal.....	15.75 to 16.75

**Finished Iron and Steel.**—Demand continues quiet but steady. Some producing interests report a volume of specifications sufficient to keep plants running to full, or nearly full capacity. February does not represent a tonnage quite equal to that for January, although it was of good aggregate. There has been no weakening in prices and the feeling exists that in March a buying movement of the proportions of that of January will again be in evidence. The Corrugated Bar Company, Buffalo, has taken 600 tons of reinforcing bars for the Husted Milling Company's elevator, Buffalo River. Revised plans for the Erie Barge Canal terminal, in Buffalo Harbor, requiring a considerable steel sheet-piling, will be ready for bids about April 1. Bids are being received this week for 110 tons for the Eureka Coffee Company's warehouse, Buffalo. Bids are in for 200 tons for the United Hardware Supply Company, Erie, Pa., and for 800 tons for the General Electric Company at Erie. The Buffalo Structural Steel Company has 500 to 600 tons for the Husted elevator. The Lackawanna Bridge Company

has 1500 tons for the Alaska-Gastineau Company, Alaska.

**Old Material.**—Business is good at the settled level of prices reported last week, which are now firmly held by dealers. Sales of considerable tonnages are being closed at prevailing prices for delivery in 30 to 60 days, as the market is considered to be on a stable basis for some time to come, and consumers are taking advantage of this condition. Most all materials on the list have been dealt in, with particularly good demand for old car-wheels. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$10.50 to \$11.00
Bundled sheet scrap.....	6.75 to 7.25
No. 1 busheling scrap.....	9.50 to 10.00
No. 2 busheling scrap.....	7.00 to 7.50
Low phosphorus steel scrap.....	15.50 to 16.25
Iron rails.....	15.00 to 15.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 railroad and machinery cast.....	12.00 to 12.50
Old steel axles.....	17.00 to 17.50
Old iron axles.....	22.50 to 23.00
Old carwheels.....	12.00 to 12.50
Railroad malleable.....	10.75 to 11.25
Locomotive grate bars.....	9.50 to 10.00
Wrought pipe.....	8.50 to 9.00
Machine shop turnings.....	6.50 to 7.00
Heavy steel axle turnings.....	8.25 to 9.00
Clean cast borings.....	6.75 to 7.25
Stove plate (net ton).....	9.75 to 10.00
Bundled tin scrap.....	12.00

## Birmingham

BIRMINGHAM, ALA., March 2, 1914.

**Pig Iron.**—The price now generally obtained for Birmingham district pig iron is \$11 for Southern delivery and \$10.75 in competitive territory, although in some instances a higher rate is secured. One interest has sold 1000 tons for March to June delivery for \$11.50 and another 200 tons at the same price. Several thousand tons were entered at \$11.50, but this iron was of specified analysis. It is stoutly denied that there is any \$10.50 iron to be had in Birmingham, and there is every reason to credit this statement. Certainly no furnace interest has any to sell at that price unless a very large tonnage was taken, and there are several manufacturers who would not sell at this figure under any circumstances, owing to the comfortable state of their order books. The Tennessee accumulations continue to undersell Birmingham because of the difference in the freight rate, but there is little of that iron left. General demand has fallen off and reports continue of the backwardness of the small buyers owing to comparative dullness in the foundry trades. J. C. Maben, president of the Sloss-Sheffield Steel & Iron Company, credits the interest in foreign irons with the state of the market. Numerous small lots have changed hands at \$11 to \$11.25 for Southern delivery. Regular operations at the wire mill of the American Steel & Wire Company will take 10,000 tons monthly from the foundry make. The Tennessee Company is relining one of its Ensley stacks. The new stack of the Woodward Iron Company is reported as operating splendidly, making 350 to 400 tons per diem. We quote, per gross ton, f.o.b. cars Birmingham, as follows:

No. 1 foundry and soft.....	\$11.25 to \$11.50
No. 2 foundry and soft.....	10.75 to 11.00
No. 3 foundry.....	10.25 to 10.50
No. 4 foundry.....	10.00 to 10.25
Gray forge.....	9.75 to 10.00
Basic.....	10.50 to 11.00
Charcoal.....	23.50 to 24.00

**Cast-Iron Pipe.**—Operations at pipe plants are normal, and orders in hand and in sight are sufficient to justify a maintenance of quotations. Tampa, Fla., has taken 2000 tons and sales have been made to Cuba of 16-ft. pipe which will necessitate improvements at a local plant. Western business has been good. We quote, per net ton, f.o.b. pipe yards, as follows: 4-in., \$22; 6-in. and upward, \$20, with \$1 added for gas pipe.

**Coal and Coke.**—The coal trade continues to suffer from a lack of demand, a condition especially affecting the domestic mines, which are operating only a few days a week. It is generally agreed that conditions have never been much worse than at this time. The demand for coke is still light, but there has been better business than for several weeks. Prices have not improved

and will continue low until foundries commence buying for the second half of the year. We quote, per net ton, f.o.b. ovens, as follows: Furnace coke, \$2.25 to \$2.50; foundry, \$3 to \$3.25.

**Old Material.**—The demand for heavy machinery cast as well as stove plate has improved and sales of various other grades of old material are reported. The market has been slow to improve, but seems to be able to hold its own. We quote, per gross ton, f.o.b. dealer's yards, as follows:

Old iron axles (small) .....	\$14.50 to \$15.00
Old steel axles (light) .....	14.50 to 15.00
Old iron rails .....	13.00 to 13.50
No. 1 railroad wrought .....	10.00 to 11.00
No. 2 railroad wrought .....	8.50 to 9.00
No. 1 country wrought .....	8.00 to 8.50
No. 2 country wrought .....	9.50 to 10.50
No. 1 machinery cast .....	9.50 to 10.00
No. 1 steel scrap .....	8.00 to 8.50
Tram carwheels .....	9.50 to 10.00
Standard carwheels .....	10.50 to 11.00
Stove plate .....	8.00 to 8.50

## St. Louis

ST. LOUIS, Mo., March 2, 1914.

**Pig Iron.**—Furnace representatives have been instructed to mark up prices and quotations today are \$11 per ton for No. 2 Southern foundry, Birmingham basis; \$14.25 for No. 2X Chicago and \$13.50 for No. 2 Northern, Ironton basis. Some furnaces have ordered even higher prices, apparently to shut off business. There have been some tentative inquiries for the last half. Foundries generally are taking iron as specified in contracts. No excessive quantities are reported in yards and in stove foundry quarters larger forces are being put at work. Transactions for the past week have been in lots of 500 tons and below. The only large inquiry unfilled is one for 500 tons of charcoal carwheel iron.

**Coke.**—Specifications for delivery are well up to contract allotments, but no new orders of size have come in from the foundries.

**Finished Iron and Steel.**—No large transactions are reported but specifications on contracts are up to contract allotments. Fabricators are reasonably busy and report the architects' boards well filled with business, though mostly of the small type. They are keeping their yard stocks up, expecting to be called upon actively with the arrival of open weather.

**Old Material.**—While there have been some reductions in prices, they have not been due to weakness, but rather to a recognition that the recent excitement was a little overdone, so some of the dealers state. Lists out include one from the Missouri Pacific of about 1200 tons and one from the Wabash of 1500 tons. Relaying rails continue in good request and are hard to get. We quote dealers' prices, f.o.b. St. Louis as follows:

### Per Gross Ton

Old iron rails .....	\$11.50 to \$12.00
Old steel rails, rerolling .....	12.00 to 12.25
Old steel rails, less than 3 feet .....	11.00 to 11.50
Relaying rails, standard section, subject to inspection .....	23.00 to 24.00
Old carwheels .....	11.00 to 11.50
No. 1 railroad heavy melting steel scrap .....	10.50 to 11.00
Shoveling steel .....	9.50 to 10.00
Frogs, switches and guards cut apart .....	10.50 to 11.00
Bundled sheet scrap .....	4.50 to 5.00

### Per Net Ton

Iron angle bars .....	\$11.00 to \$11.50
Steel angle bars .....	9.25 to 9.75
Iron car axles .....	17.50 to 18.00
Steel car axles .....	13.00 to 13.50
Wrought arch bars and transoms .....	12.50 to 13.00
No. 1 railroad wrought .....	9.00 to 9.50
No. 2 railroad wrought .....	9.00 to 9.50
Railroad springs .....	9.00 to 9.50
Steel couplers and knuckles .....	9.00 to 9.50
Locomotive tires, 42 in. and over, smooth .....	10.00 to 10.50
No. 1 dealers' forge .....	8.00 to 8.50
Mixed borings .....	4.00 to 4.50
No. 1 busheling .....	8.00 to 8.50
No. 1 boilers, cut to sheets and rings .....	6.25 to 6.75
No. 1 cast scrap .....	10.50 to 11.00
Stove plate and light cast scrap .....	8.50 to 9.00
Railroad malleable .....	8.25 to 8.75
Agricultural malleable .....	7.75 to 8.25
Pipes and flues .....	6.75 to 7.25
Railroad sheet and tank scrap .....	6.50 to 7.00
Railroad grate bars .....	7.50 to 8.00
Machine shop turnings .....	5.00 to 5.50

## San Francisco

SAN FRANCISCO, CAL., February 24, 1914

Improvement in trade conditions from week to week is hardly perceptible, but most lines are moving more freely than at the end of January, and a slightly better feeling prevails. While business last week was retarded by a storm which interrupted communication in some parts of the State, enough inquiries were received to indicate preparations on about the normal scale for spring activities. Numerous construction contracts have been let for which material is still to be purchased, and additional contracts are pending. The least satisfactory phase of the situation is the jobbing trade, which has so far made but little headway, while resale prices in general fail to reflect the firmness in primary markets. Merchants' specifications are still held down pretty closely to nearby requirements.

**Bars.**—The local bar market shows little change, as the distributive trade is picking up very slowly, while supplies of imported material continue to accumulate, with a heavy tonnage due to arrive during the spring and summer. A good demand is expected later in the season, but has not yet appeared. Scattering orders aggregating a fair tonnage are coming out for reinforcing bars, but the volume is hardly up to expectations and prices show little strength.

**Structural Material.**—Contracts of an important nature are still lacking, and none of the large local jobs in prospect are ready for figuring, though bids are being taken on a good-sized project at Los Angeles. A number of apartment houses for San Francisco are also being figured this week, including the Heyman apartments, about 275 tons; the Hooper building and the P. J. Gartland building at Polk and Geary streets. Figures will also be taken shortly on a seven-story building on O'Farrell street near Taylor, and local fabricators expect to get a substantial tonnage out of these and similar buildings in fairly definite prospect. Fabricators are limiting their purchases rather closely to work actually in hand, and are not attracted by the present quotations on foreign shapes.

**Rails.**—Business the last fortnight has been hardly up to expectations, being confined almost entirely to light rails, for which orders are small, but slowly increasing in number. There is a fair tonnage in prospect as soon as weather conditions favor outside work. Business in heavy rails from local roads depends upon financial adjustments, for which considerable time may be required. There have been several rumors of new track-laying by the transcontinental lines, but nothing definite. This city will probably be in the market before long for the projected municipal railroads.

**Plates.**—Inquiries from small consumers are somewhat more numerous, but merchants are buying only from hand to mouth. The tonnage for large tank and ship construction, however, is coming out fairly well. According to the annual report of the Standard Oil Company of California, estimates for construction for 1914 involve an expenditure of about \$5,000,000, including a new steamer, steel tanks of 3,500,000-bbl. capacity, etc. The Union Oil Company has placed a contract for a steel tank steamer of 67,000-bbl. capacity. The manufacture of tank cars has been undertaken at Richmond, Cal., and will probably require considerable material.

**Sheets.**—The requirements of consuming industries have not increased much as yet, and the heavy demand brought about by the orange freeze last year is lacking, though a fair general demand is expected early in the second quarter. Jobbers are still holding off, and neither buyers nor sellers appear anxious to close contracts for extended delivery.

**Standard Pipe.**—Oil field business is slow, being retarded partly by weather conditions, which render deliveries in that section extremely difficult. The local consuming demand is only moderate, and with resale prices at a low level merchants are keeping their purchases very close to actual needs.

**Cast-Iron Pipe.**—The most encouraging feature is an increase of inquiries from corporations. No important municipal contracts have been closed lately, but



a small tonnage will be placed this week by Vallejo, Cal., and Bellingham, Wash., is also taking figures on a small lot. Antioch, Cal., is expected in the market shortly, and Sunnyvale, Cal., has sold a bond issue for water works extension.

**Pig Iron.**—The local foundries have not noticeably enlarged their scale of operations, and while a few scattering inquiries for larger lots than have recently been purchased are appearing, most melters are disposed to hold off unless they can get bargain prices. The majority, in fact, seem reluctant to buy much in excess of current needs at any price. No. 2 Southern foundry iron is nominally valued here at about \$21, but it is doubtful if anything of similar grade could be sold at that figure.

**Coke.**—With more than ample supplies on hand and additional arrivals expected within the next two months, buying is entirely on a hand-to-mouth basis, with actual consuming requirements in the foundry trade hardly up to normal. Prices, however, are quoted about as before, at \$13 to \$14 per net ton, ex yard, and \$11 to \$12 per gross ton, to arrive.

**Old Material.**—Large holders of steel melting scrap remain firm in their views as to values, and report sales either already closed or in immediate prospect, for shipment to points at some distance from this market. It is reported that 1500 tons of old coiled railroad springs will be shipped to Italy. Rerolling rails are extremely scarce, and dealers are asking about \$16.50 per net ton, though buyers have not yet met this figure. Wrought scrap finds a fairly steady demand at \$13 to \$15 per net ton, while cast-iron scrap moves slowly at \$16.50 to \$17.

## German Market Not Wholly Dark

Some Reports Gloomy, but There Are a Number of Features of Brighter Color

BERLIN, February 19, 1914.

The leading newspaper of Essen characterized the situation yesterday as follows: "The market has grown very quiet the past few days, and there is almost no buying, as many consumers believe that they will be able to buy more cheaply later on. Work at the mills does not correspond to the amount of orders booked, and there is an evident tendency to make concessions to induce buyers to send in specifications. Prices are therefore tending lower and can no longer be kept at their previous level. Where mill owners see that prospective buyers have serious intentions they are willing to make concessions. Dealers are hardly getting more than 97.50 marks (\$23.21) for bars. Drops in prices are observed in plates, particularly at the Siegerland mills, where even the best grades are now selling below 100 marks (\$23.80)."

On the other hand, the export prices of certain products are slightly higher this week. A Cologne dispatch gives the following as the prices f.o.b. Antwerp, for German steel: Bars, 92 to 93s. (\$22.39 to \$22.63), against 91 to 92s. (\$22.15 to \$22.39) last week; band iron, 117 to 118s. (\$28.47 to \$28.71), against 116 to 117s. (\$28.22 to \$28.47); rivet bars 93 to 94s. (\$22.63 to \$22.88), against 92 to 93s. (\$22.39 to \$22.63). Other prices were unchanged.

A better tendency is reported from the pig-iron trade. The home trade has grown more active, both for Luxemburg iron and for higher qualities, and considerable quantities have been sold. In the Silesian district the demand for pig iron from Russia is so heavy that it keeps all the furnaces in blast. The general foreign demand has been improved by the easier state of the money markets and by the better reports from the American trade. It is now asserted in explanation of the sharp reduction reported in the January shipments of the Steel Works Union that it was due in part to the cold weather, which checked the movement by water, and it is said that the February movement will show a small relative increase.

Orders for structural shapes have increased, raising the hope that the building trade will revive within a

few months and cause still more active buying. The Steel Works Union today opened export business in structural shapes for the next quarter at unchanged prices.

It is reported that the Wire Rod Association had orders booked February 15 amounting to 150,000 tons, which is a gain of 20,000 tons since January 1, and will keep the mills at work for nearly four months. Five big producers of rods—Rombacher, Röchling, de Wendel, the Burbach-Eich-Düdelingen combination and the Nieder-Rheinische Hütte—are asking the association to sanction certain community-of-interests arrangements which they have made with wire mills, and it is said that if their request is granted a long step will have been taken toward organizing a general combination embracing all products from rods to wire nails. It is strongly believed that the arrangement will be approved.

The January pig-iron report showed a total production of 1,566,500 tons, which is a decrease of 43,000 tons on December, and is the biggest reduction shown in any month for some years. Notwithstanding the shrinkage of production, stocks at the furnaces increased 38,000 tons to a total of 653,000 tons.

Thyssen (Gewerkschaft Deutscher Kaiser) has arranged to enlarge his imports of ores from Caen, France, where he owns a one-fourth interest in the Aciéries at Haut-Fournaux de Caen. The latter is preparing to exploit its ore properties on a larger scale, and Thyssen will take a yearly minimum of 800,000 tons of roasted ores grading at least 40 per cent. He is to supply the Caen company with coke and coal in return, so that he will have the advantage of cargo for his vessels in both directions.

New orders for steel castings are reported as coming in more slowly, and prices are at a very low level. The concerns operating independently of the great mixed works are feeling the competition that has sprung up from the latter establishments. The association is now selling medium castings at 170 to 180 marks (\$40.46 to \$42.84) a ton, whereas the price when it was organized seven years ago was 280 to 300 marks (\$66.64 to \$71.40).

## British Iron Market Dull

Sentiment Appears to Be Deteriorating and Much Disappointment Is Felt

(By Cable)

LONDON, ENGLAND, March 4, 1914.

All markets continue dull, waiting for something to develop a lead. Disappointment is felt in the fact that no stirring is observed in the demand. Sentiment seems to be deteriorating again, with no evidence of definite improvement on the Continent. Stocks of pig iron in Connal's stores are 133,082 tons, against 130,366 tons a week ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. 1½d. (\$3.19), against 13s. 3d. (\$3.22) one week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 50s. 4½d. (\$12.25), against 50s. 6½d. (\$12.29) one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. 9d. (\$12.34), against 51s. (\$12.41) one week ago.

Hematite pig iron, f.o.b. Tees, 62s. 3d. (\$15.14), against 62s. 6d. (\$15.21) one week ago.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 17s. 6d. (\$28.59).

Steel ship plates, Scotch, delivered local yards, £6 17s. 6d. (\$33.46).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 (\$43.80).

Steel rails, export, f.o.b. works port, £5 19s. (\$28.95).



The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 81s. (\$19.70).  
 German 2-in. billets, f.o.b. Antwerp, 76s. (\$18.48).  
 German basic steel bars, f.o.b. Antwerp, £4 10s. to £4 11s. (\$21.90 to \$22.14), a decline of 24c.  
 German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

(By Mail)

### British Markets Disturbed by Irregularities on the Continent

LONDON, ENGLAND, February 20, 1914.

There has been a more cheerful tone about the Cleveland warrant iron market the last fortnight, but prices have at intervals shown considerable irregularity. Not much interest has been shown by consumers, whose purchases, as for a long time, have been confined to pressing needs, except in so far as hematite is concerned. Here some heavy buying has been done under the lead of the largest Sheffield consumers, who have their order books well filled for the rest of the year, and there has been an increased amount of activity observable among Midland people. At the extreme points of the recent upward movement, say around 51s. for cash, there was some heavy selling of warrants on the open market, which was attributed partly to forward operations by important Cleveland ironmasters, who as is often the case when a poor view is taken of the market resort to the warrant section to conceal their hands and yet make considerable sales.

The general position of the iron and steel trades is certainly better than it was, but there does not seem to be much ground for taking a very enthusiastic tone about things. Probably so far as semi-finished steel and finished iron are concerned there is not room for much additional depreciation, but with fuel costs falling pretty sharply there is no reason to look for higher pig iron. Pig iron has indeed been too dear in relation to the finished and semi-finished material, and an adjustment is necessary. While the best is being made of things in England the reports from the Continent are not altogether pleasant reading, especially the heavy increase in stocks of pig iron in Germany. Within the last few days dealers here have been trying to get through business in German hematite. Up to 66s. 6d. (\$16.17), c.i.f. Wales, was bid for round lots to the German Pig Iron Syndicate, which refused them, but it appears that the buyers closed with merchants for a matter of 10,000 tons at 66s. (\$16.05), c.i.f. It is reported that some Spanish hematite has also been bought for Wales, but it is doubtful whether this is actually business.

There is a better tone in Continental semi-finished steel. One or two of the largest consumers in this country have bought rather freely lately, and this has given the Stahlwerks Verband a better order book, while at the same time the Belgians have sold pretty well, and neither of these is now open to sell any important quantities for export. The French, who have been pressing steel on the market at low prices, have shown more stiffness and have pushed their rates close up to those which the leading sellers demand.

Finished steel is a shade firmer, and here and there works have a fair amount of order on their books, but there is room for a considerable expansion in this respect. Much interest is shown in the newly formed conference for the tin plate trade. It looks as if something more or less stable would be fixed up, but hopes are not very sanguine as to its permanence, owing to the diversity of interests involved, to say nothing of Welsh temperamental difficulties.

Neil McNeill & Co., Ltd., opened offices February 14 at Gordon Chambers, 82 Mitchell street, Glasgow, Scotland, as iron and steel merchants and brokers, and will be under the management of Neil McNeill, who for a long time was an active partner in the late firm of James Watson & Co.

## New York

NEW YORK, March 4, 1914.

**Pig Iron.**—Eastern business has been tied up by the remarkable storm of the past few days and a number of local offices have been cut off from communication with salesmen. Apart from the report of two furnaces in eastern Pennsylvania which were obliged to bank because of non-receipt of coke, interruptions to production have not figured in the news of the week. The Delaware, Lackawanna & Western is in the market for 400 tons for its Scranton, Pa., foundry, and the New York Central has bought 250 tons, another of the moderate requisitions it has been making in recent months. A large soil pipe concern is inquiring for iron for the second half and has placed an order for Eastern delivery in the second quarter, while a New Jersey manufacturer of pipe fittings is taking prices on 1800 tons for delivery in the second quarter. Another New Jersey buyer has placed several thousand tons of foundry iron for second quarter. A few cases are reported in which foundries are using up the iron on their contracts faster than they calculated when the orders were placed, but it does not appear that foundry consumption in general is increasing, though here and there a hopeful note is sounded as to prospects for the opening of spring. The disposition of furnace companies is to ask higher prices for deliveries in the second quarter and they are quoting a further advance on any inquiry which involves shipments after July 1. At Buffalo, for example, \$13 to \$13.25 would be asked for second quarter iron and in some cases \$13.50, while for delivery in third quarter or second half, \$14 to \$14.25 is considered the usual asking range. Eastern furnaces, likewise, are up from their recent selling basis. This firmer attitude, it must be said, is coincident with a quite inactive market. The extent to which concessions would be made from these asking prices should there be a show of real demand is a question. At the moment the firmer attitude of the furnaces seems to be due to the fact that most of them have more than a fair amount of business on their books for the next two months. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15.25 to \$15.50; No. 2 X, \$14.75 to \$15.25; No. 2 plain, \$14.50 to \$14.75. Southern iron is on the basis of \$15.25 to \$15.75 for No. 1 and \$15 to \$15.25 for No. 2.

**Finished Iron and Steel.**—With the absence of new buying, the encouraging situation is the continued full specifications on contracts being received from consumers, with recurring evidence that much of the steel is for immediate consumption and not for stocks. In some cases there is pressure for quick deliveries on these specifications. Prices continue firm, though with the large number of structural projects awaiting decision, price concessions are thought likely if the waiting for settlement is of much longer duration. Local fabricating capacity, which is large, is not comfortably booked, but railroad car builders, for example, have closed for a fair number of cars since the first of the year and exhibit no anxiety if the early future business does not materialize heavily. Reports of foreign importations seem to arise chiefly if not wholly from cases or transactions involving material to be reshipped. A very recent quotation on foreign bars figures back to 1.10c., f.o.b., to which must be added about 0.15c. for ocean freight as well as duty, lighterage and other port charges and financing and profit before a comparison should be made with American prices. Some of the Eastern railroads are expected shortly to come into the market for round quantities of bars, chain and spikes and other track accessories. The buying of cars continues at the recent fair rate with the following among purchases since the last report: 1000 hopper cars for the Reading, to the Cambria Steel Company; 300 mining cars for the Clearfield Coal Corporation to the Hockensmith Car Company; 83 passenger equipment for the Missouri Pacific to the American Car & Foundry Company; 117 box and other cars for the Bangor & Arrostook to the Standard Steel Car Company; 585 gondolas for the Virginia Southwestern to the Pressed Steel Car Company, these in addition to 400 closed last

week. The Southern Railroad is still in the market for 2025 cars; the St. Louis & South Western is in the market for 1500 to 2000 cars; the Pittsburgh Railways is expected shortly to close for 225 traction cars and the taking of bids on the New York Central cars has been postponed to March 9. About 85 ore cars, requiring about 1000 tons of steel, are also in the market, 25 for Phelps, Dodge & Co., and 60 for Chile for the American Smelting & Refining Company. Among structural lettings may be mentioned 4800 tons to the American Bridge Company for subway work, Seventh avenue, New York; 1500 tons to Milliken Brothers for the Waldorf loft, West Thirty-second street; 1200 tons to the Dominion Bridge Company for the Laurentide Pulp & Paper Company, Hamilton, Ont.; 900 tons to McClintic-Marshall Company for catenary construction for the Pennsylvania Railroad, and 600 tons to the King Bridge Company for two transfer bridges for the New York Central. It is understood that the American Bridge has 2500 tons for the Delaware, Lackawanna & Western, part for train shed and part for bridge work, at Buffalo. One of the new building projects in New York is the Astor apartment, Broadway, Eighty-ninth to Ninetieth street, involving 2500 tons, and the Boston & Maine is taking bids on three bridges, aggregating 300 tons, and a 6-story building in Brooklyn for the Brooklyn Trust Company will soon be up for figures. We quote mill shipment for steel bars, plates and structural material for early shipment at 1.20c. to 1.25c., Pittsburgh, or 1.36c. to 1.41c., New York; iron bars, 1.30c. to 1.35c., New York. We quote iron and steel bars from store at 1.90c. to 1.95c., and shapes and plates, 1.95c. to 2c.

**Ferroalloys.**—Inquiries are so meager and sales so few that a market price for 80 per cent. ferromanganese is hardly established. It is probable that it can be bought at \$39 to \$40, Baltimore, depending on conditions, and this applies to both the English and German grades. Nothing is heard of any business done by the domestic producer. Quotations for 50 per cent. ferrosilicon are still \$73, Pittsburgh, for carloads; \$72 for 100 tons and \$71 for 600 tons and over.

**Cast-Iron Pipe.**—Newark, N. J., will open bids on 1400 tons of high pressure pipe March 5. This is the only public letting of importance in sight at present in this vicinity. The private demand is decidedly quiet and prices are weak. Carload lots of 6 in. are quoted, nominally, at \$22 to \$23 per net ton, tide-water.

**Old Material.**—No general improvement in the demand has been experienced. Inquiries are few. An exception to the dulness is the reported sale of 8000 tons of wrought pipe to an eastern Pennsylvania consumer, presumably for extended delivery, at \$11.75 delivered. The heavy blanket of snow now covering the country does not seem to have so diminished the available supply as to cause consumers to draw on dealers' stocks to any extent. Prices are weaker, except on relaying rails, wrought pipe and heavy cast scrap. Quotations are nominally as follows, per gross ton, New York:

Old girder and T rails for melting...	\$9.00 to	\$9.50
Heavy melting steel scrap .....	9.00 to	9.50
Relaying rails .....	21.50 to	22.00
Rerolling rails .....	11.00 to	11.50
Iron car axles .....	19.50 to	20.00
Steel car axles .....	13.50 to	14.00
No. 1 railroad wrought .....	11.50 to	12.00
Wrought iron track scrap .....	10.00 to	10.50
No. 1 yard wrought, long .....	9.50 to	10.00
No. 1 yard wrought, short .....	8.75 to	9.25
Light iron .....	4.00 to	4.50
Cast borings .....	6.50 to	7.00
Wrought turnings .....	6.50 to	7.00
Wrought pipe .....	9.00 to	9.50
Carwheels .....	12.00 to	12.50
No. 1 heavy cast, broken up .....	11.50 to	12.00
Stove plate .....	8.50 to	9.00
Locomotive grate bars .....	7.50 to	8.00
Malleable cast .....	8.00 to	8.50

After six years of idleness the second wheel foundry at the Huntington, W. Va., plant of the American Car & Foundry Company is starting up. The other foundry has been operating for some time on chilled wheels, but the demand has increased beyond its capacity.

## Cincinnati

CINCINNATI, OHIO, March 4, 1914.—(By Wire.)

**Pig Iron.**—A large buyer will place his orders soon for 4000 tons of Northern foundry iron, 2000 tons of Southern and 1000 tons of silvery for April-December shipment. The showing for Ohio silvery irons the past week is above the average. A Michigan consumer closed for 600 tons; two Indiana buyers for approximately 300 tons each and there are several deals pending with others involving a comparatively substantial tonnage. The business just mentioned was taken at \$16 at furnace, based on an 8 per cent. analysis, although shipments are extended into the last half. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$14.50 to \$15.00
Southern coke, No. 2 f'dry and 2 soft.	14.00 to 14.50
Southern coke, No. 3 foundry .....	13.50 to 14.00
Southern, No. 4 foundry .....	13.00 to 13.50
Southern gray forge .....	12.50 to 13.00
Ohio silvery, 8 per cent. silicon .....	17.20 to 17.70
Southern Ohio coke, No. 1 .....	15.20 to 15.70
Southern Ohio coke, No. 2 .....	14.20 to 14.70
Southern Ohio coke, No. 3 .....	13.95 to 14.20
Southern Ohio malleable Bessemer .....	14.20 to 14.70
Basic, Northern .....	14.20 to 14.70
Lake Superior charcoal .....	16.25 to 17.25
Standard Southern carwheel .....	27.25 to 27.75

(By Mail)

**Coke.**—The extremely cold weather that has prevailed for two weeks has brought out an extraordinary demand for coal, and in some cases this has worked toward strengthening coke prices on prompt shipment orders. Few standard Connellsville 48-hr. brands are now obtainable below \$2 per net ton at oven, which figure also represents the contract price for last half delivery, although several of the best grades are not obtainable below \$2.10. Foundry coke for either prompt or on contract ranges from \$2.50 to \$2.60 per net ton at oven, Connellsville. Wise County and Pocahontas furnace coke is about 15c. a ton above the quotation named, while foundry grades are close to the maximum price quoted on Connellsville 78-hr. coke. There is not much demand for foundry coke.

**Finished Material.**—Both black and galvanized sheets continue to show strength, and although weather conditions are not conducive to bringing out any prompt shipment business, it is stated that the carload orders received are holding up to almost the usual standard for this time of the year. Warehouse business is slow on both steel bars and small structural shapes. It has been hard to make shipments on less than carload orders, and there is no demand now for building material of any kind from this immediate territory. On No. 28 black sheets, we quote 2.15c. and on galvanized 3.15c., f.o.b. cars Cincinnati, or Newport, Ky. Steel bars, from warehouse stocks, are unchanged at 1.75c. to 1.80c. and small structural shapes around 1.85c.

**Old Material.**—Very little buying or selling has been done. Prices are weaker, and a general reduction of 25c. a ton has been made. It is problematical as to what effect better weather conditions would have on the market. While a better demand would be brought out, several dealers claim it would also tend to increase the offerings. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap .....	\$7.25 to \$7.75
Old iron rails .....	12.25 to 12.75
Relaying rails, 50 lb. and up .....	20.25 to 20.75
Rerolling steel rails .....	11.25 to 11.75
Melting steel rails .....	9.75 to 10.25
Old carwheels .....	10.75 to 11.25

Per Net Ton	
No. 1 railroad wrought .....	\$9.25 to \$9.75
Cast borings .....	5.00 to 5.50
Steel turnings .....	5.00 to 5.75
No. 1 cast scrap .....	9.75 to 10.25
Burnt scrap .....	6.50 to 7.25
Old iron axles .....	17.25 to 17.75
Locomotive tires (smooth inside) .....	10.25 to 10.75
Pipes and flues .....	6.75 to 7.25
Malleable and steel scrap .....	7.75 to 8.25
Railroad tank and sheet scrap .....	5.75 to 6.25



## Metal Market

NEW YORK, March 4, 1914.

### The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin,		Lead		Spelter	
Lake	Electro-lytic	New York	York	New York	St. Louis	New York	St. Louis
Feb. 15.00	14.50	38.37½	4.00	3.87½	5.35	5.20	
26 15.00	14.50	38.00	4.00	3.87½	5.35	5.20	
27 15.00	14.50	38.00	4.00	3.87½	5.35	5.20	
28 15.00	14.50	38.00	4.00	3.87½	5.35	5.20	
Mar. 2 15.00	14.50	38.00	4.00	3.87½	5.35	5.20	
3 15.00	14.37½	37.90	4.00	3.87½	5.30	5.15	
4 15.00	14.37½	37.90	4.00	3.87½	5.30	5.15	

Copper is lower and quiet. Tin has declined in a dull market. Lead continues inactive and prices are unchanged. Spelter is five points lower and demand is absent. Antimony is without features of interest.

### New York

Copper.—The market has been dull and the present tendency is one of decline. The metal can be obtained to-day at 14.37½c., cash, New York. According to rumor, two or three large consumers have had a hand in causing the decline in that they are said to have flatly refused to pay more than 14.50c., delivered, cash, 30 days. At least two producers are willing to sell on this basis and it is possible that an even lower price might be obtained. Inquiry has been a trifle more active. Lake continues nominal at 15c., cash, New York, with choice brands quoted higher. It is declared that no Lake has been sold for April shipment. Exports in February again were large, amounting to 34,384 tons. Exports so far this month total 967 tons. The London quotations to-day were £64 2s. 6d. for spot and £64 12s. 6d. for futures.

Copper Averages.—The Waterbury average for the month of February was 15.12½c. The average New York price for Lake copper, based on daily quotations in *The Iron Age*, was 15c., and electrolytic, 14.62c.

Tin.—Business has been almost at a standstill and the price has dropped to 37.90c. February 26 the market was strong at over 38c. and sellers were reluctant to quote. The following day conditions were reversed, there being many sellers, but buyers had become wary and all interested were trying to figure out the erratic actions of the London market. On Friday and on Saturday sales of futures were made at very low prices. Monday and Tuesday all business was upset by the big snowstorm and such transactions as there were involved only small amounts and consumers in the immediate vicinity. With interior points nothing was done. The London quotations to-day are £173 5s. for spot and £175 7s. 6d. for futures. Arrivals this month total 1230 tons and there is afloat 3132 tons. Deliveries into consumption in February were good, amounting to 3300 tons, which exceeded estimates. The total deliveries for two months of this year show a decrease of 300 tons as compared with the same time last year. The total visible supply February 28 was 17,308 tons, which was 5004 tons above that of the same date last year.

Lead.—In this market there have been more sellers than buyers and practically the only activity was on Friday and Saturday when consumers bought sparingly. According to report, 3.85c., St. Louis, was offered last week, but the price has been almost uniform at 3.87½c. If prices were any higher conditions would justify a decline, but they are believed to be at the bottom. The exports referred to last week have been confirmed, it now being definitely known that several hundred tons were sent to Europe by way of Southern points. These shipments, more of which are expected to follow, will probably ease the foreign market and at the same time exert a steadying influence here. The New York quotation is unchanged at 4c.

Spelter.—Prices have declined about five points, making the New York quotations 5.30c. to 5.35c. and those in St. Louis, 5.15c. to 5.20c. The market is quiet.

Antimony.—There are no changes of interest, quo-

tations standing at 7.20c. to 7.25c. for Cookson's, 7c. to 7.25c. for Hallett's and 6c. to 6.25c. for Chinese and Hungarian brands.

Old Metals.—The market continues dull. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	14.00 to 14.25
Copper, heavy and wire	13.50 to 13.75
Copper, light and bottoms	12.75 to 13.00
Brass, heavy	9.25 to 9.50
Brass, light	7.75 to 8.00
Heavy machine composition	12.50 to 12.75
Clean brass turnings	9.00 to 9.25
Composition turnings	11.50 to 12.00
Lead, heavy	3.75
Lead, tea	3.50
Zinc, scrap	4.25

### Chicago

MARCH 2.—With the prospect of liberal sales as an incentive, sellers of copper are abandoning their somewhat arbitrary position on prices and concessions of ¼c. and ½c. per lb are being made. The decline in quotations for tin has likewise continued. We also revise our quotations for lead, in keeping with the new prices of the leading interest. We quote as follows: Casting copper, 14.75c.; Lake copper, 15c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 39c.; small lots, 41c.; lead, desilverized, 4c., and corroding, 4.25c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.30c.; Cookson's antimony, 9.50c.; other grades, 8c.; sheet zinc, \$7.25, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 11c.; copper clips, 11.25c.; red brass, 11.25c.; yellow brass, 8.25c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 25c.; tin-foil, 29c.; block tin pipe, 32c.

### St. Louis

MARCH 2.—Transactions have not been especially notable. Lead closed today at 3.92½c.; spelter, 5.20c.; Lake copper, 15.15c. to 15.25c.; electrolytic, 14.97½c. to 15.22½c.; tin, 38.15c. to 38.55c.; Cookson's antimony, 7.60c. Joplin ore production was still somewhat restricted by weather conditions, with the selling price \$41 to \$43 per ton for 60 per cent. and the top settlement \$46. Calamine ranged from \$21 to \$22 for 40 per cent., with top settlement at \$26 to \$27. Lead was dull at \$50 for 80 per cent. We quote all metals as follows: Light brass, 5c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9c.; heavy copper and copper wire, 10c.; zinc, 2.75c.; lead, 3c.; tea lead, 2.75c.; pewter, 22c.; tin-foil, 29c.

## Iron and Industrial Stocks

NEW YORK, March 4, 1914.

Prices of industrial securities have not been so much affected by unfavorable influences of the past week as railroad stocks. It is noteworthy that quite a number of industrial stocks attained comparatively high figures in the period under review. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com. 13 - 13½	Pressed Stl., com. 41½ - 43½
Allis-Chal., pref. 48	Pressed Stl., pref. 103 - 103½
Am. Can., com. 28½ - 30½	Ry. Spring, com. 27 - 29½
Am. Can., pref. 91½ - 93	Ry. Spring, pref. 96 - 98½
Am. Car & Fdy., com. 49½ - 50½	Republic, com. 24 - 25½
Am. Car & Fdy., pref. 117	Republic, pref. 88 - 89½
Am. Loco., com. 33 - 35	Rumely Co., com. 12½ - 14½
Am. Loco., pref. 101 - 102	Rumely Co., pref. 28 - 32½
Am. Stl. Fdries. 35½ - 36	Pipe, com. 12½ - 13½
Bald. Loco., com. 42½ - 49½	Pipe, pref. 46 - 47½
Bald. Loco., pref. 106½ - 106½	J. S. Steel, com. 63½ - 66½
Beth. Steel, com. 36½ - 39½	U. S. Steel, pref. 109½ - 110½
Beth. Steel, pref. 76½ - 79½	Va. I. C. & Coke, 50 - 52
Case (J. I.), pref. 88 - 88½	West'gh'ae Elec. 69½ - 71½
Colorado Fuel. 31 - 32	Am. Ship, com. 36
Deere & Co., pref. 95 - 96	Am. Ship, pref. 86 - 88
Gen. Electric. 146½ - 148½	Chic. Pneu. Tool. 57½ - 58
Gt. N. Ore Cert. 35½ - 37½	Cambria Steel. 49½ - 50½
Int. Harv., com. 103 - 105½	Lake Sup. Corp. 22
Int. Harv., pref. 117	Pa. Steel, pref. 66
Int. Harv. Corp. 103 - 108	Cruc. Steel, com. 16½ - 16½
Int. Harv. Corp., pref. 117	Cruc. Steel, pref. 93½ - 94½
Lackawanna Stl. 37½ - 38½	Harb. Wk. Ref., pref. 99
Nat. En. & Stl. com. 11½ - 12½	La Belle Iron, com. 44½



### Dividends Declared

The American Car & Foundry Company regular quarterly, 1% per cent. on the preferred and ½ of 1 per cent. on the common stock, payable April 1.

The La Belle Iron Works regular quarterly, ½ of 1 per cent. on the common and 2 per cent. on the preferred stock, common being payable April 30 and preferred March 31.

The National Lead Company regular quarterly, ¾ of 1 per cent. on the common stock, payable March 31.

The Railway Steel Spring Company regular quarterly, 1% per cent. on the preferred stock, payable March 20.

### Rerolled Reinforcing Bars Tested

Tests in the laboratory of Purdue University, Lafayette, Ind., are stated to have proved conclusively that steel reinforcing bars for concrete construction rerolled from old steel rails may be safely used in such work. About 1000 samples of bars were tested which had been collected from five mills in several States. The samples were taken at different times and under various conditions so as to represent the average output of the mills. The difference between the bars rolled at the several mills was found to be comparatively small. The general tendency shown in these tests was toward a decrease in strength and an increase in the elongation as the size of the bars increased. A part of this general tendency was considered to be due to the fact that a portion of the larger sizes tested were twisted bars. The tests showed that the straight round bar was the strongest and the twisted bar the weakest of the design commonly used. According to Dr. W. K. Hatt, head of the department of civil engineering, under whose direction the tests were conducted, the largest bar which should be used should not be more than 1 in. in diameter. The round bar was found to be more efficient if it had small ribs on the surface, serving to give a better hold in the concrete.

The Perfection Spring Company, Central avenue and East Sixty-fifth street, Cleveland, Ohio, has issued an 82-page book, entitled "Your New Car." About half of the book is given over to the discussion of the finishing of the body of the car and the care of the oil and tires, while the remainder is devoted to a discussion of the methods employed by this company in the manufacture of the springs for motor cars, together with a brief résumé of the users of metals from 10,000 B. C. to the present time. The booklet is illustrated with a number of photomicrographs of the various kinds of steel and a number of views taken in the plant of the company.

At the annual meeting of the stockholders of the Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, the following officers were re-elected: President, Col. James Kilbourne; vice-president, F. A. Jacobs; general manager, James R. Kilbourne; treasurer, F. C. Eaton; auditor, Joseph D. Potter; secretary, Lincoln Kilbourne; assistant secretary, Clyde Roth. In his annual address President Kilbourne stated that prospects for the current year's business are unusually promising. The company recently made large additions to its plant which are now in operation.

The Workmen's Compensation Service Bureau has established offices in the Majestic Building at Milwaukee, Wis., in charge of Hugh Nesbitt, manager, and F. H. Blum, chief inspector of factories. The bureau handles the industrial insurance business of 22 insurance companies. Inspector Blum has high praise for the activities and efforts of the Industrial Commission of Wisconsin, which, he says, has improved to a point of excellence the conditions with regard to accident prevention of all of the factories and workshops he has so far inspected.

The Humphries Mfg. Company, maker of pumps and plumbers' brass goods, Mansfield, Ohio, has opened an office at 1800 Fisher Building, Chicago, with Mr. Strinsky in charge.

### New Process Gear Corporation Expands

The New Process Gear Corporation, Syracuse, N. Y., is erecting a new concrete and steel building 40 x 100 ft., three stories, to provide additional facilities for spur and bevel-gear work. This building is to be absolutely fireproof and will contain entirely new equipment. Among machines already ordered are 17 Gleason bevel-gear generators, 14 Potter & Johnson automatic turret lathes, 6 Gould & Eberhardt bevel-gear blocking machines and 2 Fellows spiral-gear shapers, all to serve as additions to the larger batteries of similar machines now in service in the main plant. The necessity for such substantial equipment increase within a year after the company's already large plant had been doubled indicates the appreciation of its product by customers.

This company was incorporated as the New Process Raw-Hide Company in 1888, the earlier name coming from the extensive manufacture of New Process noiseless raw hide gears and pinions. That line in later years was supplemented by metal gear work to an extent necessitating a change to the present name on January 1, 1913.

### Pennsylvania Steel Company Extensions

Recently the Pennsylvania Steel Company served notice on some of its tenants at Steelton, Pa., to vacate houses which must be removed for the improvement of track arrangements. This has given rise to various statements in the daily press concerning extensions to the steel plant. It is understood that the programme of 1914 improvements at Steelton is under consideration, but has not been definitely determined upon. In *The Iron Age* of January 1 reference was made to the work done in 1913 on the extensions which were outlined in the last annual report of President Felton. In this report the estimate put upon the complete programme of additions, requiring several years for its completion, was about \$10,000,000.

The Galion Iron Works & Mfg. Company, Galion, Ohio, has under construction a plant addition, 60 x 165 ft., two stories. It will be built of steel, brick and concrete and will be ready for occupancy about March 15. The increase in the company's capital stock to \$1,000,000, which was made at the time of the recent reorganization and change in name, was made to take care of increasing business in roadmaking and contractors' machinery, cast-iron and corrugated culvert pipe and roadmakers' supplies and to provide additional factory buildings. The controlling interests and management are unchanged. D. C. Boyd is president and general manager; F. W. Faber, vice-president, and F. W. Biehl, secretary and treasurer. These, with G. L. Stiefel, Dr. C. D. Morgan, J. L. Gugler and Henry Gottdiener, constitute the board of directors. All are residents of Galion except Mr. Gottdiener, who resides in Cleveland.

The National Enameling & Stamping Company has issued its report for the year ended December 31, 1913. The income account is as follows:

Gross profits .....	\$1,632,396
Other income .....	16,253
<b>Total income .....</b>	<b>1,648,649</b>
Expenses .....	597,102
<b>Net profits .....</b>	<b>1,051,546</b>
Interest, discount, etc. ....	162,273
Sinking fund .....	128,000
Preferred dividend .....	598,262
<b>Balance .....</b>	<b>163,011</b>
Previous surplus .....	1,315,073
<b>Profit and loss surplus .....</b>	<b>\$1,478,084</b>

The Mohawk Valley Mfg. Company, Oneida, N. Y., is engaged in the manufacture of carriage hardware and malleable iron castings. It makes over 100 different styles of carriage chafe irons and also makes all kinds of malleable iron castings. A. G. Snyder is president; Mrs. Isabelle Snyder, treasurer; Miss Agnes Drum, secretary.

## Personal

William Sloane Accles, European manager of the Niles-Bement-Pond Company, has arrived on a visit to the United States.

G. H. Charls, manager of sales, American Rolling Mill Company, Middletown, Ohio, is taking a combined business and pleasure trip in Europe.

Daniel M. Wright, of the Henry & Wright Mfg. Company, Hartford, Conn., manufacturer of drilling machines, was elected president of the Hartford Board of Trade, at the annual meeting last week.

L. W. Hostettler, formerly assistant manager of the Crescent Forgings Company, Verona, Pa., has resigned to become sales manager of the Diamond Forging & Mfg. Company, North Side, Pittsburgh.

R. T. Scott has been appointed Pittsburgh district representative of the Independent Pneumatic Tool Company, Chicago, and will have offices in the Farmers' Bank Building.

Chairman John A. Topping, of the Republic Iron & Steel Company, New York, is spending the month of March at Jekyll Island, Georgia.

George A. Howells, Ingersoll-Rand Company, New York, has been confined to his home since February 14, when he fell on an icy sidewalk and fractured a bone above the ankle. It will be some time before he can return to his office.

Marshall Prentiss, Prentiss Tool & Supply Company, New York, has gone South for a vacation of about two weeks.

Ellis F. Muther, New York manager of the Gisholt Machine Company, who was operated on recently for appendicitis, has returned to his office duties.

William Robertson, since 1903 treasurer of the Standard Chain Company, Pittsburgh, has resigned and will give his attention in the future to his clay business in Beaver County, Pa., of which his son, James L. Robertson, has been in charge. Stanley Mann, formerly assistant treasurer, has been made treasurer, effective from March 2.

P. Eyermann, formerly of Dubois, Pa., and in the past few years engineer in charge of construction at the Witkowitz Bergbau & Eisenhuetten Gewerkschaft, Witkowitz, Austria, has been appointed general superintendent of the new Austrian Steel Company at Brux, Bohemia.

William Wuthenow, for several years assistant to Chairman John A. Topping, Republic Iron & Steel Company, New York, has been appointed general superintendent for the Western works of that company with offices at Chicago, succeeding Charles H. Burgess. The Western district takes in the Inland works at East Chicago, Ind., the Indiana bolt and nut plant at Muncie, Ind., and the Sylvan works at Moline, Ill.

Archibald Johnston, first vice-president Bethlehem Steel Company, returned last week from a trip of several months to China in the interests of his company.

John G. Bray has been made chemist and engineer of tests of the Federal Steel Foundry, Chester, Pa. He formerly held a similar position with the Penn Steel Casting & Machine Company of that city, and was recently an inspector for R. W. Hunt & Co.

R. C. Farris, head of the credit department of the American Stamping & Enamel Company, Bellaire, Ohio, who was secretary-treasurer of the old Enterprise Enamel Company before the merger, has resigned and has been succeeded by E. L. Evans. William G. Hedes, of New York, late of Landers, Frary & Clark, has become head of the sales department.

Frederick C. Thomas has been elected a director of the Vulcan Detinning Company, succeeding Benjamin Nicoll, resigned.

John P. Munn and Phillip B. Jennings have been elected directors of the Railway Steel Spring Company to fill the vacancies created by the resignations of William M. Barnum and Waldo H. Marshall.

W. I. Middleton, electrical engineer of the Simplex Wire & Cable Company, delivered a lecture, illustrated

by lantern slides, on the manufacture and testing of insulated wires and cables, at the Franklin Union, Boston, Mass., on February 26.

Alexander Hamilton has been elected president of Baker & Hamilton, dealers in heavy hardware and agricultural implements, San Francisco, succeeding the late Wakefield Baker. Phillip Stone Baker is now vice-president and secretary; A. S. Holmes, second vice-president, and Horace Coffin, assistant secretary and treasurer. Charles D. Graham remains manager of the New York office.

James L. Gough, formerly with the Marshall-Huschart Machinery Company, Chicago, has become general sales manager of the C. C. Wormer Machinery Company, Detroit, Mich.

## Obituary

DR. EDWIN J. HOUSTON, Philadelphia, Pa., died March 1, aged 70 years. He was a native of Alexandria, Va., and was taken as an infant to Philadelphia, graduating from the Central High School in 1864. After teaching for some time in a private school he returned to the high school as professor of civil engineering and was subsequently given the chair of natural philosophy and physical geography, engaging in business as a consulting engineer about 20 years ago. With Elihu Thomson, one of his former pupils, he invented the Thomson-Houston electric system, which comprises traction, arc lighting and incandescent lighting. He was president of the American Institute of Electrical Engineers for two terms. He was chief electrician of the World's Fair at Chicago in 1893, was a member of many societies and had written 100 books on scientific subjects.

RALPH ALBREE, Pittsburgh, Pa., died in New York City February 16, while on a visit, aged 42 years. He was treasurer of the Chester B. Albree Iron Works Company, Pittsburgh. He was a native of Pittsburgh and was graduated from Yale University in 1894. He leaves a widow, four sons and three daughters.

CALEB COLVIN, Worcester, Mass., died February 16, aged 85 years. He was the founder of the Caleb Colvin foundry which later became the L. W. Pond Machine & Foundry Company, of which he was president and treasurer at the time of his death. He was born at Cranston, R. I., and in 1847 became an iron molder apprentice. His first engagement in business for himself was at Danielson, Conn., in 1863, where he established a foundry partnership with a brother. Selling out his interest to his brother two years later, he went to Worcester and established the business with which he was connected for the remainder of his life. He leaves a widow and two sons.

ANDREW HORATIO REEDER died at the Hahnemann Hospital, Philadelphia, February 26, aged 45 years. He was born at Easton, Pa., and was the eldest son of the late Gen. Frank Reeder. He was graduated with honor at Lafayette College in 1890, and after some engineering service took charge of the H. C. Frick Coal & Coke Company, Uniontown, Pa. Subsequently he became an expert consulting engineer and in that capacity was employed by the Virginia Iron, Coal & Coke Company in connection with improvements in its plant at Toms Creek, Va. His recommendations were so successful that he was made general superintendent of the plant. He was next general manager of the Crows Nest Pass Coal Company in northwestern Canada. He then became general manager of the Stonega Coal & Coke Company and allied interests at Big Stone Gap, Va., later becoming vice-president and general manager, holding this position at the time of his death. He leaves a widow and two children.

DAVID B. HYDE, formerly of the Springfield Mfg. Company, Springfield, Mass., later with the Safety Emery Wheel Company, Springfield, Ohio, and finally connected with the Pittsburgh Emery Wheel Company, Pittsburgh, died February 14 at his residence at Riverside, Cal. He had not been active in business for some time.



# The Machinery Markets

Viewing the markets collectively, the run of business continues irregular and this is also true of most of them individually. Where there is any increase in activity it has come slowly and not nearly as fast as was expected. Some districts show no improvement. In the East business has been badly hampered by severe snow and wind storms which tied up transportation and communication. New York is unchanged except that conditions have been made quieter by severe weather conditions. In New England improvement is not as rapid as was expected, but while business is still below normal there has been a steady betterment. The Cleveland market is irregular with small orders predominating, but the trade has before it some good business in the requirements of a new plant which is to manufacture road and farm tractors. In Cincinnati slight improvement is shown as far as domestic demand for machine tools is concerned and some plants are less busy, but the export demand is more encouraging. February was more active than January in Detroit and business in some lines is livelier, though demand generally is under normal. Despite light orders machine tool manufacturers are optimistic in Milwaukee, but the demand for heavy machinery and power equipment is inactive. The weather has caused a setback in the Central South, but there is an undercurrent of activity. St. Louis conditions show slow improvement. February was a disappointment in Birmingham, the mill and mining interests having been poor buyers. In Texas there has been but little change, the cold weather having held back business. A good feature in the Pacific Northwest has been heavy shipments of electrical machinery and agricultural implements to the Far East and otherwise conditions are promising.

## New York

NEW YORK, March 4, 1914.

A negative report is the best that can be given of the local market. February sales, taken in the aggregate, were only fair. A bright spot, of which there are few nowadays, was the purchase of six automatic screw machines by a ball bearing manufacturer in northern New Jersey. As heretofore stated, machines of this class have had the best call of late. One company received an order recently for 11 for shipment to England. On general machinery, scattered inquiries continue to come along, but buying is slow. The railroads show but little interest. Some of the manufacturers of motor car equipment are operating more slowly than they were a year ago, but makers of automobile fire engines in southern New York State are busy. The entire East has been hard hit by the heavy snowfall and wind storm which swept over the Atlantic coast states. The exceptional snowfall paralyzed transportation of all kinds, causing a shortage of coal in some cases, interrupted communication and temporarily deprived many plants of electric power because of fallen wires. It will be some days before normal conditions are restored. Since Sunday salesmen have found it difficult to get in or out of New York and the mails have been seriously interfered with.

The Magnus Beck Brewing Company, Buffalo, has let contracts for a 25 x 60 ft. addition to its engine room for which some new equipment will be required.

The D'Arcy Mfg. Company, Buffalo, has been incorporated with a capital stock of \$25,000 to erect and equip a factory for the manufacture of patented meter boxes for gas and water meters, etc. John C. and Charles F. Yearke are interested.

The Monarch Engineering Company, Chamber of Commerce Building, Buffalo, have received the contract for a 1,500,000 bus. grain elevator, reinforced concrete and structural steel, to be erected on the Buffalo River by the Husted Milling Company at a cost of \$500,000. E. M. Husted is president.

A machine shop is to be added to the municipal waterworks plant at Erie, Pa. George C. Gensheimer is secretary.

The Ideal Mfg. Company, Erie, Pa., has been formed for the manufacture of a patented sash ventilator, hardware specialties, etc. The business will be extended and new machinery will probably be installed.

The Rochester Gas Appliance Company, Rochester, is starting the construction of a factory, five stories, at Winsor and Main streets, at a cost of \$55,000.

Charles C. Hopkins, engineer, Cutler Building, Rochester, has completed plans for a municipal water works for Arkport, N. Y. Bids will be received in about 30 days.

The John Petrossi Company, Rochester, N. Y., was awarded contract for the erection of a sewage disposal

plant for the village of Fairport, N. Y. R. L. Williams is village clerk.

The Toohey Silk Mills, Watertown, N. Y., has been incorporated with capital stock of \$100,000 to equip a factory for the manufacture of textiles. R. Mercereau, G. B. Neals and L. E. Conklin, 59 Wall street, New York City, are the incorporators.

The Campbell Cart Company, Rochester, has been incorporated with a capital stock of \$50,000 to manufacture racing sulkies, driving carts, etc. D. E. Campbell, Rochester, and G. A. and C. R. Durfee, Macedon, N. Y., are the incorporators.

The Quaint Art Furniture Company, Syracuse, will receive bids for a factory building, power house, etc., 42 x 256 ft., three stories, which it will erect at East Syracuse at an estimated cost of \$60,000. Charles L. Litchison is president.

Stanton P. Lee, architect, Troy, N. Y., is receiving bids for a factory 100 x 100 ft., four stories, to be erected on River street for Hall, Hartwell & Company, Troy, N. Y., shirt manufacturers.

The Interstate Machinery Company, Troy, N. Y., has recently erected a large addition to its plant. The company buys and sells used iron and wood working machinery, etc.

The Morrow Mfg. Company, Elmira, N. Y., will build an addition to its factory, 100 x 350 ft., one story.

The Vacuum Oil Company, North Olean, is building a plant at a cost of \$47,300.

The National Metal Coating & Lithographing Company, Elizabeth, N. J., manufacturer of metal coating, lithographing metal, etc., is building additions to its factory. It is in the market for shears, power presses, lithographing presses, etc., all second hand and in good condition.

The Monroe Dairy Supply Company, Sussex, N. J., manufacturer of milk pasteurizers, coolers and retarders, is making extensive improvements to its factory and is in the market for some of the following machines: punches, presses, lathes, drills, slitting machines, bending machines, squaring machines, bar cutters, and miscellaneous small metal working machines. J. D. Haggerty is president.

The Sartiron Utilities Mfg. Company, North Pelham, N. Y., has been incorporated with a capital stock of \$100,000, to manufacture electric pressing sad-irons, etc. M. C. and H. D. Downs and L. B. May, New York City, are the directors.

The Penn Yan Cable Company, Penn Yan, N. Y., has been incorporated with a capital stock of \$50,000 by E. R. Ramsey, G. S. Sheppard, Penn Yan, and W. H. Reefus, East Orange, N. J., to manufacture electric cables, insulating safety devices, electric appliances, etc.

The silk dyeing plant of Henry Hahn, Haverstraw, N. Y., has been extensively enlarged, and new equipment is being installed.

The Corp Automatic Rural Mail Box Company, Schenectady, N. Y., has been incorporated with a capital stock of \$60,000 to manufacture mail boxes and accessories. E. H. Jackson, D. S. Ferguson and F. H. Glock are the directors.

### Catalogues Wanted

R. O. Walling, mayor, Keyport, N. J., desires catalogues and price lists covering the following machinery: one duplex air compressor, 12 x 14 x 12 in.; one 100-hp. return tubular boiler. Gustave Voelcher, Matawan, N. J., is the engineer.

## New England

BOSTON, MASS., March 3, 1914.

Improvement in business has not proceeded as rapidly as was expected by many observers among the manufacturers and dealers, and business does not average normal. The increase in the demand for most lines of products while slow seems steady. The last month has reached about the limit in the way of New England weather, which probably has some local influence. Few announcements of additions to manufacturing plants have been made in the last fortnight; but the spring should see a pretty good amount of industrial expansion.

The Corbin Cabinet Lock Company, New Britain, Conn., has brought out a safety guard for presses and drops, which constitutes an important addition to the modern devices for the protection of employees in industrial works.

The New England Pressed Steel Company has acquired the manufacturing building along the Boston & Albany Railroad on Washington avenue, Natick, Mass., recently occupied by the Plympton Mfg. Company, and will establish its works there.

The Waltham Watch Company, Waltham, Mass., has acquired the business of the Waltham Clock Company of that city, and will absorb it, increasing the line. The Watch Company is running full, with 3700 hands working 55 hours a week. A year ago the factory was operating on a 75 per cent. basis of production.

The Standard Plunger Elevator Company, Worcester, Mass., and New York, has been placed in the hands of a receiver, who has been authorized to continue the business. A receivership has been established for the Stamford German Silver Company, Stamford, Conn., this action resulting from a disagreement among the owners, rather than from financial difficulties, it is understood. The receivers of the Pope Mfg. Company, Hartford, Conn., have been authorized to continue to operate the business for an additional four months.

The McLane Silk Company, Turner's Falls, Mass., will erect a mill in that town. F. A. McLane, Holyoke, Mass., is president and general manager.

The French Mfg. Company, Waterbury, Conn., manufacturer of brass tubing, has awarded the contract for a large addition to its works.

The Warner-Childs Paper Company, Medford, Mass., will build an addition to its factory to cost \$35,000.

The Kennedy & Peterson Construction Company, Manchester, N. H., will build a factory.

The town of North Andover, Mass., has appropriated \$1600 for a boiler for the pumping station.

## Philadelphia

PHILADELPHIA, PA., March 2, 1914.

The S. A. Ashman & Son Company, Tioga and Tulip streets, Philadelphia, is building a forge shop, 44 x 58 ft., one story, at a cost of \$3000.

M. H. Dickinson, architect, 1524 Chestnut street, Philadelphia, will receive bids for boiler, elevators and other equipment for the loft building, 206 South Twenty-fourth street, for Joseph J. Greenberg, Morris Building.

John D. Allen, architect, Deuckla Building, Philadelphia, has drawn plans for a five-story factory, 48 by 50 ft., to be erected at Mt. Vernon and Watts streets for R. M. Baithwait.

The Camden County Tuberculosis Sanitarium, Camden, N. J., has plans for an electric light and heating plant. F. W. George, Camden County Court House,

Camden, N. J., should be addressed. Bids will be received until March 9.

T. P. Kelly & Co., manufacturers of foundry facings, graphite and graphite lubricants, have concentrated their business at Stockertown, a suburb of Easton. The new factory replaces those at Bloomsbury, N. J.; Otto, Pa., and Glens Falls, N. Y. It will have three times the combined capacity of these plants.

The Victor Balata & Textile Belting Company, 51 Beekman street, New York, has plans for a factory to be erected at Easton, Pa.

The Magnetic Pigment Company, Baltimore, Md., is enlarging its factory on Cass street, Trenton, N. J., at an estimated cost of \$40,000. Specifications include electric light and heating equipment.

## Chicago

CHICAGO, ILL., February 28, 1914.

For such demand as the market affords, machinery dealers have been compelled to depend upon general industrial renewals. These have been both limited and of miscellaneous character. Railroad purchases remain at a minimum and buying by the steel and rolling mills, which aggregates a large total during the year under normal conditions, is conspicuous by its absence. The spring season of building, especially public and municipal, is responsible for a fair inquiry for power plant equipment.

The Inland Steel Company, Chicago, is inquiring for a second hand guillotine bar shear with capacity for shearing 1 1/4-in. square, and a power pipe-threading machine with a range up to 6 in. The tools are for the company's Chicago Heights plant.

The T. S. Wheel & Mfg. Company, Chicago, recently incorporated, is about to erect a machine shop, 50 x 120 ft., on Packard avenue, Cudahy, Wis. The architects are Kirchoff & Rose, Majestic Building, Milwaukee.

The Interstate Car Company, Chicago, has been incorporated with a capital of \$100,000 to engage in the railroad supply business. It has been organized by David L. Blelock, 223 East Sixtieth street, C. S. Holzmman and C. E. Fitch.

The Carter White Lead Company, Chicago, has had plans prepared for a factory, 60 x 234 ft., three and four stories, to be erected on Peoria street at a cost of \$200,000.

Curt Teich & Co., Chicago, makers of postal cards, have had plans prepared for a factory, 58 x 130 ft., three stories, which will involve an estimated expenditure of \$25,000.

The Sykes Company, Chicago, has been incorporated with a capital stock of \$150,000 to do a general manufacturing and construction business. The incorporators are Albert S. Louer, 76 West Monroe street, C. D. White and Mathias Cannon.

The Manz Engraving Company, Chicago, is building an addition to its factory at 4001 Ravenswood avenue. It will be 68 x 80 ft., three stories, and will cost \$30,000.

F. C. Jorgeson & Co., 159 North Ann street, Chicago, manufacturers of showcases, have taken out a permit covering the erection of an addition to their factory, 50 x 60 ft., at a cost of \$10,000.

The Safety First Mfg. Company, Chicago, has been incorporated with a capital of \$10,000 by P. H. Truman, 53 West Jackson boulevard, H. M. Gillespie and L. A. Falkenberg to manufacture railroad appliances.

The Merchants Motor Truck Mfg. Company, Chicago, has been organized with a capital of \$100,000 to engage in the manufacture of motor vehicles. The incorporators are Clayton A. Martin, 3321 Palmer avenue, Joseph W. Misk and William Schulze.

The Woods Mobilette Mfg. Company, Chicago, has been organized with a capital of \$10,000 by James W. Sheridan, William M. Sheridan and John C. Long. The company may be addressed at 189 West Madison street.

The Simons Motor Company, Quincy, Ill., has been incorporated with a capital stock of \$20,000 by Edwin T. Simons, J. M. Simons and Gustave A. Urban and will equip a motor manufacturing and repair plant.

The Sanitary Stove Mfg. Company has been organized with principal offices at Benton, Ill. The incorporators are Charles A. Aiken, Jr., Moses Pulverman and David Schlesinger.



The city of Elgin, Ill., has authorized improvements in its lighting plant which will require an expenditure of about \$80,000. Communicate with John S. Russell of that city.

The Keokuk Box Company, Keokuk, Iowa, suffered a severe loss as the result of a fire February 20 which damaged both building and machinery.

The Standard Motor Company, Mason City, Iowa, has purchased the Hackney Mfg. Company, St. Paul, Minn., manufacturer of the Hackney auto plow tractor, and will add this to its line of motor trucks and automobiles. It is reported that the St. Paul factory will be enlarged.

The Denver Ice & Cold Storage Company, Davenport, Iowa, will erect an ice plant at Nahant at an estimated cost of \$50,000. Geo. N. Albright is manager.

The Priebe-Mathews Carriage Company, Des Moines, Iowa, was damaged by fire at an estimated loss of \$30,000.

The Fairmont Machine Company, Fairmont, Minn., will erect a fireproof factory building at an estimated cost of \$50,000.

The factory of the Northern Mfg. Company, 420 Third avenue, North Minneapolis, Minn., was destroyed at an estimated loss of \$100,000.

The Ida Grove Ice & Fuel Company, Ida Grove, Iowa, is building an ice plant. The equipment will include a 100-hp. engine.

The Northern Veneer Company, Deer River, Minn., has been incorporated with a capital stock of \$25,000. The incorporators are T. B. Wilson, Frank Pierce, Frank Carter and others. A factory will be built and new equipment installed.

The town of Mt. Pleasant, Iowa, is in the market for a steam pump of 1000 gal. per min. capacity.

The town of Aurora, Neb., will call for bids for a pump.

A waterworks plant will be constructed by the town of Albany, Wis., at a cost of \$20,000.

Bids will be received by Joseph Benesh, town clerk, Chelsea, Iowa, for one 200-gal. per min. triplex pump, 15 hp. oil engine, valves, etc., in place. E. E. Harper, 911 Grand Avenue Temple, Kansas City, Mo., is the engineer.

Bids will be received by J. J. Rainbow, auditor of Blackhawk County, Waterloo, Iowa, until March 20 for a building for the poor and insane. The specifications include an electric light and heating plant.

Bids will be received by John F. Bruzek, city clerk, New Prague, Minn., until March 10 for a 66-in. high-pressure horizontal tubular boiler.

The Willmar Water & Light Company, Willmar, Minn., will install one steam engine to develop 125 hp. and one steam engine to develop 175 hp., both equipped with all necessary fittings, valves, etc.; one 100-kw. electric generator, one 150-kw. electric generator, one exciter of at least 9 kw. and one exciter of at least 12 kw. Bids will be received at the first March meeting of the town council. E. C. Wellin is mayor.

The factory of the Northern Mfg. Company, 420 Third avenue, North Minneapolis, Minn., was destroyed by fire at an estimated loss of \$80,000.

The Automatic Heat Regulator Company, 411 Lowry Annex, St. Paul, Minn., will build a factory. Details are lacking.

Andrew Saffert, New Ulm, Minn., is building a cold storage plant and factory. C. A. Berger, 811 Sykes Building, Minneapolis, Minn., is the architect.

The North Star Machinery Company, Faribault, Minn., has been incorporated by E. F. Swanson and others.

## Milwaukee

MILWAUKEE, WIS., March 2, 1914.

Business continues light, with orders small. The general feeling among metal tradesmen is that the recent improvement is being accelerated. Approaching State and Congressional elections are disturbing business somewhat in Wisconsin. Abnormally large taxes have created general dissatisfaction and have in a small measure curtailed buying. Tool builders are feeling more optimistic as the result of better orders, but

heavy machinery and power equipment builders find slight solace in present bookings. Opinion prevails that it will be at least another month before the anticipated revival of business sets in with any degree of force.

The factory of the Sheriffs Mfg. Company, South Water and Barclay streets, Milwaukee, propeller wheels and marine machinery, was gutted by fire February 25. The loss is about \$25,000. It will resume business, but plans are as yet indefinite. George D. Sheriffs is president.

George C. Ehlers, 721 Third street, Milwaukee, Wis., has drawn plans for a factory, 25 x 105 ft., three stories. Details are lacking.

The Wisconsin Dental Bur Company, Hartford, Wis., will increase its capital stock from \$30,000 to \$50,000 and purchase a considerable amount of special tools and machinery. H. J. Bosworth, Chicago, is president, and Frederick Kehr is factory manager.

The Juneau Automatic Carrier Company, Juneau, Wis., manufacturing litter carriers and farm machinery, has moved into larger quarters in the plant of the Juno Motor Truck Company, Juneau. A few tools will be purchased at once, but no important additions to equipment will be made until later.

Benjamin Vollendorf, electrical engineer for the Manitowoc and Two Rivers works of the Aluminum Goods Mfg. Company, has resigned to organize the Manitowoc Electric Works, which will specialize in power installations and build and repair electrical equipment. Walter M. Tompkins, Appleton, Wis., and Frank Hrabik, Manitowoc, are associated with Mr. Vollendorf. Temporary quarters have been established at 808 Buffalo street, Manitowoc.

The machine shop and blacksmithing department of the Rhinelander Iron Company, Rhinelander, Wis., was badly damaged by fire. The structure will be rebuilt at once and damaged equipment replaced.

The Smalley Mfg. Company, Manitowoc, Wis., has increased its capital from \$50,000 to \$100,000. It is reported that important additions to buildings and equipment will be made. Chester Smalley is manager.

The James Mfg. Company, Ft. Atkinson, Wis., will erect a brick and reinforced concrete factory, 132 x 154 ft., two stories, at an estimated cost of \$20,000.

The Antigo Electric Company, Antigo, Wis., will increase its capital by \$10,000 for the purpose of doubling its output.

The J. Thompson & Sons Mfg. Company, South Beloit, Wis., has been sold at receiver's sale to the Beloit Savings Bank for \$30,441.

The H. J. Nelson Machine Company, Green Bay, Wis., has been reorganized and will be hereafter the Nelson-Indra Machine Company, indicating the entrance of Louis G. Indra into the business. The company will increase its machine equipment for the better handling of its increased repair business.

## Detroit

DETROIT, MICH., March 2, 1914.

While there was considerably more activity in the local machine tool market last month than in January, business was below normal and inclined to be irregular. There has been no decided change during the past week; a moderate volume of sales was reported and considerable inquiry was received, a pleasing feature of which was the increased call for standard tools. Conditions among the general manufacturers are said to be improving and many concerns are adding to their payrolls. Both the steel casting and gray iron foundries are getting new business and plants are operating on a better basis. More activity is being displayed in building circles, some of the new projects being of considerable size.

The Detroit Universal Wire Wheel Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture automobile wheels. George E. Goble and William N. Edson are the principal stockholders.

Dodge Brothers, Detroit, manufacturers of automobile parts, will erect a one-story addition to their plant to be used as a cleaning room.

Fire caused a loss of \$15,000 at the plant of the Swift & Co. packing plant, February 25. It is stated that a quantity of machinery was destroyed.

The Michigan Lubricator Company, Detroit, has filed articles of incorporation, giving its capital stock as \$200,000. The incorporators named are John B. Corliss, John Coyne and Edwin C. Nagel.

The Detroit-Marvel Brass Mfg. Company, Detroit, has been incorporated with \$1000 capital stock to manufacture brass goods. The incorporators are Victor D'Hondt, Peter D. Hay and Vincent J. Quinn.

The Flint Clay Products Company, Flint, Mich., has been incorporated with \$25,000 capital stock to manufacture clay products. The company will equip a plant. William Updegraff is president and general manager.

The Auto Tractor Company, Niles, Mich., which, as recently announced, has increased its capital stock to \$200,000, has begun the erection of a large factory building. New officers were elected as follows: W. H. Zimmerman, president; F. J. Plym, vice-president; F. S. Hatfield, secretary and treasurer.

The Cheboygan Limestone Company, Cheboygan, Mich., operating extensive quarries near Mackinaw City, will issue \$50,000 in bonds, more than half of which will be used to provide additional equipment.

To provide for its rapidly increasing business the Bond Steel Post Company, Adrian, Mich., has acquired a new factory which will enable it to double its output.

Henry Bowen, and others, Adrian, Mich., will establish an artificial ice plant. The plans call for a building 37 x 138 ft.

The Peninsula Power Company, Iron River, Mich., has made an appropriation of \$80,000 for the installation of two additional units in its power plant and general improvements and replacements.

## Cleveland

CLEVELAND, OHIO, March 2, 1914.

The attention of the local machine tool trade is centered on the machinery to be purchased by the Wallis Tractor Company, Cleveland, that will shortly equip its plant for the manufacture of heavy farm and road tractors. This company's requirements, which will be larger than dealers had expected, will include about 50 standard and special machines. The company is giving information to machine tool builders and dealers as to the work that is to be done and is asking for proposals for machines to do the specified operations, so that bids will not be confined to particular types of machine tools, and a list has not been prepared. Specifications have been received on some of the equipment and the company expects to place its order within 30 days. Generally the market is not active and business is confined mostly to single tool orders. The volume of business is quite irregular, often being fairly good one week and very light the next. In the aggregate February business showed some improvement over January. The demand for second-hand machinery is rather quiet.

The Vlcek Tool Company, 10,709 Quincy avenue, Cleveland, will shortly begin the erection of a two-story factory building about 60 x 180 ft., of concrete and steel construction. The company plans eventually to replace its present factory building with one of similar construction.

The National Heater Company, Cleveland, has been incorporated with a capital stock of \$100,000 by A. L. Stowell, C. H. Rayon, R. L. McCarthy, and others, to manufacture and deal in heaters.

The Knight Engine Company, Cleveland, has been incorporated with a capital stock of \$10,000 to manufacture internal combustion engines. Benjamin A. Gage, and others, are the incorporators.

The sand mill and engine house of the Sornhalter Sand & Stone Company, Massillon, Ohio, was burned a few days ago. The plant will be rebuilt.

The plant of the Rivet & Machine Company, Kent, Ohio, will be offered for sale by Charles McCuskey, trustee of the creditors, on March 13. The sale has been authorized by the Federal Court in Cleveland.

The United Steel Company, Canton, Ohio, has placed a contract with the Canton Bridge Company for the

erection of a new building in which the company's new mills will be installed.

Plans have been formulated for a new company at Canal Dover, Ohio, with a capital stock of \$50,000 to manufacture small electric motors for carpet sweepers and other purposes. It is the intention of the company to take over the two-story plant formerly occupied by the Dover Electric Company, which is fully equipped with machinery. W. A. Braun, of the Dover Mfg. Company, Canal Dover, is one of the promoters of the company.

It is announced that the Alliance Rubber Works, Alliance, Ohio, will shortly begin the erection of a large addition to its plant.

The Pantatello Company has moved from Detroit, Mich., to Lorain, Ohio, where it has established a plant for the manufacture of stove pipe and for doing light sheet and tin work.

## Indianapolis

INDIANAPOLIS, IND., March 2, 1914.

The Stutz Motor Company, Indianapolis, has completed plans for a factory to cost \$100,000, adjoining the factory of the Stutz Auto Parts Company. The main building will be 80 by 204 ft., four stories, concrete and brick. It is expected to begin building operations about April 1. The machinery equipment will be the best obtainable. Harry C. Stutz is president and Henry F. Campbell, secretary-treasurer.

The Payne Die Casting Company, Indianapolis, has increased its capital stock by \$20,000.

The Muellerschoen Home Electric Light Company, Indianapolis, has been incorporated with a capital stock of \$50,000, to manufacture individual lighting plants. The directors are C. Muellerschoen, J. M. Ahlgren and H. V. Royal.

The Indianapolis Water Company, Indianapolis, has decided to build a new pumping station to cost \$500,000. It will be auxiliary to the main plant. An Allis-Chalmers high-duty, cross-compound engine, with a daily capacity of 6,000,000 gal., and a De Laval steam turbine pumping unit, with a capacity of 12,000,000 gal. will be installed. The boiler room will be equipped with chain stokers and modern types of coal and ash handling machinery.

The International Mfg. Company, Terre Haute, Ind., has been incorporated with a capital stock of \$100,000 to manufacture machinery and life saving devices. The directors are J. R. Finkelstein, T. F. Browder and C. R. Duffin.

The National Hame & Chain Company, New Albany, Ind., has been incorporated to manufacture hames, singletrees, etc. The directors are George C. Norton and others.

Pepin's Extensible Folding Trestles & Jack Knife Bracket Company, East Chicago, Ind., has been incorporated with a capital stock of \$5000, to do a manufacturing business. The directors are J. N. Pepin, J. C. Pepin and R. Schaaf.

The Indiana Light & Fuel Company, Ft. Wayne, Ind., operating artificial gas plants at Kendallville, Garrett and Auburn, Ind., has been sold to Michigan capitalists, represented by C. A. Runyan and A. C. Runyan, South Haven, Mich., and L. F. Ryall, Sturgis, Mich., who operate the South Haven Gas Company, the Allegan County Gas Company and the Sturgis Gas Company. L. F. Ryall is manager. It will spend \$200,000 in improving the plants. Headquarters will be moved to Kendallville.

The Frazier Stove Works, Anderson, Ind., will move to Indianapolis.

The Fletcher Enamel Works, Anderson, will move to Charleston, W. Va.

The Union Sales Company, Terre Haute, Ind., has been incorporated with a capital stock of \$5000 to deal in machinery. The directors are J. R. Finkelstein, G. C. Buntin and H. D. Hughes.

The Interstate Motor Company, Muncie, Ind., has been reorganized with a capital stock of \$300,000 to manufacture automobiles. The directors are F. C. Ball, E. B. Ball and B. W. Twyman.



The Sullivan Machinery Company, a Massachusetts corporation, has incorporated in Indiana, with a capital stock of \$56,000 to manufacture machinery. The directors are F. K. Copeland, T. W. Fry and C. K. Blackwood.

The Montpelier Promotion Club, Montpelier, Ind., has been organized with a capital stock of \$10,000 to encourage the location of new industries. It will retain ownership of building sites and buildings that are offered to manufacturing concerns.

The Sheet Metal Specialty Company, Goshen, Ind., has issued \$5000 of preferred stock.

## Cincinnati

CINCINNATI, OHIO, March 2, 1914.

There is no improvement in the demand for machine tools. On the other hand, it is reported from a number of sources that conditions are quieter. There are no indications of any immediate improvement in domestic business, but the export end is more encouraging. A prominent local machine tool manufacturer, who has recently returned from a four months' tour through Europe, reports conditions there as being on the mend, and predicts an early reviving demand for tools and machinery. The jobbing foundries here are only fairly busy, a number of them only operating to about 50 per cent. capacity.

The Home Steam Avondale Laundry Company, Cincinnati, has commissioned Henry N. Hooper to prepare plans for a large building to be erected on Reading road. Power plant equipment and a sprinkler system will be required.

The Queen & Crescent Railroad Company contemplates making an addition to its shops at Chattanooga, Tenn. Later on a few machine tools, as well as woodworking equipment, will be required. No lists have been made up. A. Telford, Cincinnati, is purchasing agent.

The Boss Washing Machine Company, Cincinnati, whose plant in Norwood was destroyed by fire, has commissioned E. H. Dornette to prepare plans for a much larger plant. Considerable woodworking and other machinery will be required.

The Ideal Steel Wheel Company has decided to move its plant from Winton place, Cincinnati, to Elkhart, Ind. Some additional machinery will probably be required for the new factory. O. G. Harrison is president.

The laboratory of the Ironton Portland Cement Company, Ironton, Ohio, recently destroyed by fire, will be rebuilt at once.

The Ashland Foundry Company, Ashland, Ohio, has increased its capital stock from \$15,000 to \$20,000, and will increase its output.

The Troy Shirt Company, Troy, N. Y., has leased a large building in Washington Courthouse, Ohio, for a shirt factory. A number of electric motors and other special machinery will be required.

The Holland Glass Company, Carthage-Cincinnati, has been organized and will let contract for a glass bottle plant, for which considerable special equipment will be required.

The Troy Wagon Works, Troy, Ohio, will increase its capital stock from \$800,000 to \$1,600,000, principally for the purpose of enlarging its plant. Nothing is yet known as to the machinery requirements.

## The Central South

LOUISVILLE, KY., March 2, 1914.

An undercurrent of activity is noticeable in this market, although the cold weather has caused somewhat of a setback, snowfall, sleet and a rise in the river causing manufacturers to become cautious about making changes. These conditions are now passing and prospects are becoming brighter. Orders for boilers are coming in steadily from varied sources. Large equipment is also being sold, one concern having eighty-five carlots awaiting shipping directions. The electrical equipment trade is also showing improvement. Shipping to the South is good.

The Anglo-American Tar Products Company, Louisville, is planning the erection of a plant in St. Louis

for the distillation of tar. A. T. Hert has the matter in charge.

Additional woodworking machinery will be purchased by Peter Jacobson & Sons, manufacturers of kitchen furniture in New Albany, Ind., a Louisville suburb.

S. B. Davis, Cave City, Ky., has information concerning the organization of a company which will establish an electric lighting and ice plant.

The Kentucky Lumber Company, owning sawmills at Burnside and Williamsburg, Ky.; Lafollette, Tenn., and Sulligent, Ala., will move its main office from Cincinnati to Lexington, Ky. All equipment purchases hereafter are to be made through this office.

The Kentucky Utilities Company, Lexington, Ky., will construct a filter plant at Shelbyville, Ky., during the next twelve months.

C. V. Gammon, and others, Ashland, Ky., have organized the C. V. Gammon Candy Mfg. Company with a capital stock of \$50,000. A manufacturing plant is to be erected soon.

The Peter Fox Sons' Company will establish a large creamery at Hopkinsville, Ky., and will require refrigerating machinery.

The Chicago Veneer Company, Burnside, Ky., has been organized with a capital stock of \$200,000 by B. W. Lord, and others, to operate a veneer mill. A plant is already in operation.

O. H. Boltz, Irvine, Ky., is planning the establishment of a plant for the manufacture of 10,000 brick and concrete blocks per day.

The McCormick Lumber Company, Lexington, Ky., has been organized with a capital stock of \$75,000 to develop coal and timber lands in Powell County, Ky.

The Hadfield Rubber Company, Akron, O., is considering the removal of its plant to Nashville, Tenn.

The city of Jackson, Tenn., has sold a \$60,000 bond issue for waterworks and electric light plant improvements.

The bridge over the Tennessee River at Chattanooga, Tenn., which is being planned by the Hamilton Bridge Commission, will probably be of steel, owing to certain requirements of the War Department.

Capt. Edward Martin, Big Rock, Tenn., is organizing a company to build a 35-mile traction line from Clarksville, Tenn., to Christian and Trigg counties, Ky. It is expected that a power plant will be built.

The Electrical Transmission Company, Lee county, Virginia, is planning to triple the capacity of its power plant near St. Charles, Va. The company will produce 35,000 hp. This is to be distributed through eastern Kentucky and Tennessee. The company is controlled by the Insull interests, Chicago.

The plant of the Converse Bridge Company, Chattanooga, Tenn., is to be sold March 11 at 11 a. m. The property is valued at \$34,000. D. H. Wood is trustee.

## St. Louis

ST. LOUIS, MO., March 2, 1914.

Improvement in the machine tool market is steady, even though it be of comparatively gradual growth, and the aggregate demand for apparatus is increasing. The individual purchases are, as for several weeks, of the single tool character. There is considerable replacement work under way, and the tendency is to install tools of somewhat greater capacity. Large lists are not yet available, but impending plans may soon bring out considerable buying. Second-hand tools are in some request, particularly in small plants just starting. Collections are reported reasonably satisfactory.

The Anglo-American Tar Products Company, with plants in New York and Louisville, will equip a plant in St. Louis at a cost of about \$250,000 to utilize the tar product of the Laclede Gas Company, St. Louis, from which it has contracted to take about 8,000,000 gal. annually.

The Western Wire Products Company, St. Louis, has been incorporated with a capital stock of \$75,000 by Ira J. Young, John P. Klein, Henry Reichmann and others to manufacture wire weaving, knitting machines and wire, iron and steel working machines.

The Crescent Motor Car Company, St. Louis, has been incorporated with a capital stock of \$50,000 by George A. Root, Albert G. Wilson, Jr., and William H. Foster to manufacture motors, motor cars, engines, accessories, etc. A repair plant will also be installed.

The Typewriter Calculating Attachment Company, Bank of Commerce Building, St. Louis, has plans for the equipment of a factory for the manufacture of a patented device. S. G. Sutherland and J. E. Pilcher are interested.

The Century Engineering & Construction Company, Joplin, Mo., has been incorporated with a capital stock of \$10,000 by W. C. and George W. Thayer and P. O. Beeson and will purchase equipment to enter general contracting and construction work.

The city of Callao, Mo., on February 24 voted a bond issue to cover the cost of a municipal electric light plant.

An additional unit is to be added to the electric light plant of the city of Columbia, Mo., and the work is in the hands of the mayor, W. P. Moore.

The Crystal Ice Company, Canton, Mo., which has been incorporated with a capital stock of \$15,000 by Charles F. Eckert, George L. Hatzler and Frank E. Payne, is reported in the market for the necessary equipment for early delivery.

The Goodenow-Brookfield Knitting Company, Kansas City, recently reported as increasing its capital stock from \$35,000 to \$100,000, did so for the purpose of doubling its mechanical capacity as well as otherwise extending its business.

R. P. Paulsen, Webb City, Mo., is reported as having plans for the equipment of a knitting mill.

The board of directors of the school system of Kansas City, Mo., J. H. Brady, chief engineer, is in the market for the manual training shop equipment of the new central high school there and also heating, vacuum cleaning, ventilating and other mechanical apparatus.

The Morrilton Cotton Oil Company, Morrilton, Ark., will rebuild and re-equip its lint, engine and machine and press departments recently burned with a loss of \$50,000.

The Huntington Electric Light & Power Company, Huntington, Ark., has been incorporated with a capital stock of \$18,000 by John Degen, H. E. Cunningham and others and will equip a public service plant.

The Magazine Electric Company, Electric, Ark., has obtained a franchise for a local public service electric plant.

The Sellman Churn & Mfg. Company, Little Rock, Ark., has been incorporated with a capital stock of \$12,000 by J. B. Sellman and others.

O. D. Tucker & Co., Inc., Little Rock, Ark., has been incorporated with a capital stock of \$10,000 by O. D. Tucker, Russell V. May and others and will operate a repair plant in connection with a garage.

The Missouri & North Arkansas Railroad, W. O. Galbreath, engineer in charge, at Harrison, Ark., will erect shops and a four-stall roundhouse at Helena, Ark., it is announced.

A large veneer plant, capacity not fully determined, will be built at Clarendon, Ark., by the Chicago Veneer Company, of which Benjamin W. Lord, Danville, Ky., is president.

The A. G. Rhodes Furniture Company, Hot Springs, Ark., has been incorporated with a capital stock of \$10,000 by A. G. Rhodes and others and will operate a wood-working plant.

The Duff & Hetzler Company, Mountain View, Ark., will install equipment for tight barrel and circle heading manufacture from white oak.

The Morgan Veneer Company, Pine Bluff, Ark., has been incorporated with a capital stock of \$100,000 by W. B. Morgan, J. F. McIntyre, H. B. Strange and others and will equip a veneer plant requiring three lathes, four boilers and four engines, rip saws, cut-off saws, etc., being in the market therefor.

The Upurdy Oil Company, Lindsay, Okla., L. W. Spaulding, treasurer, is reported in the market for complete drilling equipment. The Spaulding Oil Company is also reported as having the same plans.

The Norman Milling & Grain Company, Norman, Okla., is reported in the market for motor driven equipment for pumping for deep well and also pressure service with a daily capacity of about 250,000 gal.

The Sallisaw Cotton Oil Company, Sallisaw, Okla., whose plant suffered \$10,000 loss by fire, is reported to plan its replacement.

The city of Stigler, Okla., will proceed with its waterworks construction plans, having completed the sale of \$12,000 bonds recently authorized.

The city of Morris, Okla., with the Benham Engineering Company, Oklahoma City, Okla., in charge, has plans for the expenditure of \$40,000 on a waterworks plant under a bond issue.

The city of Henryetta, Okla., recently reported as having plans for an additional waterworks unit, has completed the authorization of \$20,000 bonds and will proceed with the work.

The Citizens Lumber Company, Soper, Okla., has been incorporated with a capital stock of \$16,000 by George W. Chandler of Hugo, C. H. Lynch of Boswell and A. J. Steen and C. L. Harris of Soper and will equip a mill.

The Williams-Miller Cotton Machinery Company, Elk City, Okla., has been incorporated with a capital stock of \$15,000 by Amos Williams, F. Miller Pease and J. W. Baker.

The light and power plant at Dustin, Okla., recently destroyed by fire, will, it is reported, be rebuilt.

The Electric Light Company, Waynesboro, Miss., has been incorporated with a capital stock of \$30,000 by J. A. Leggett, O. R. Green and C. C. Green and will equip a public service plant.

The city of Batesville, Miss., will construct a waterworks under a bond issue of \$18,000 and has employed the Dabney Engineering Company, Memphis, Tenn., to prepare the plans.

The Hattiesburg Lumber & Mfg. Company, Hattiesburg, Miss., will equip and operate a plant for the manufacture of sash, doors and general mill work. W. L. Logan is president.

The city of Mansfield, La., is in the market for waterworks and sewer system equipment under recent municipal legislation with Mayor J. W. Parsons in charge.

L. A. Lonstalot, of Franklin, La., is reported in the market for equipment for a canning plant.

The board of port commissioners of New Orleans, La., having floated a bond issue of \$3,000,000 will build six cotton warehouses with a capacity of 54,000 bales each and will equip them with machinery for handling, etc. S. L. Young is engineer in charge.

John H. Bernhard, Denegre Building, New Orleans, La., has plans for the equipment of a shipyard for building lighter barges and similar craft.

The DeQuincy Ice, Refrigerating & Fuel Company, DeQuincy, La., has been incorporated with a capital stock of \$25,000 by J. W. Brown, J. Lee Hereford and others and will equip an ice and cold storage plant.

The Railway, Light & Water Company, Lake Charles, La., will erect a pumping station and make improvements to its Lake Charles plant at a cost of \$6,000.

City Engineer I. W. Silvester is preparing plans and specifications for a municipal gas plant and system for Alexandria, La.

The city council, Abbeville, La., has voted to improve the municipal power plant at an estimated cost of \$25,000.

## Birmingham

BIRMINGHAM, ALA., March 2, 1914.

Machinery dealers report February business below expectations. There was a good retail trade in hardware and agricultural implements, but the sawmill and mining trades, as well as the manufacturers, have not been in the market. Some small dealers in second-hand machinery report slightly better trade, but as a rule there is very little optimism at this time.

J. C. Maben, president of the Sloss-Sheffield Company, Birmingham, says the type of oven to be used in the construction of the company's new plant will be agreed upon after the annual meeting in New York City March 11.

The Birmingham-Tuscaloosa Railway & Utilities Company, Birmingham, is understood to have issued \$600,000 of bonds, the proceeds of which are to be used



in the construction of a central generating station, etc., at Tuscaloosa.

The West End Brick Company, Birmingham, has been incorporated with a capital stock of \$10,000 by Charles G. Hawley and others to manufacture building brick.

The town of Tarpon Springs, Fla., has voted bonds for \$142,000 municipal improvements, including a water-works.

The town of Greer, S. C., has voted bonds for \$65,000 for an electric planting plant.

The Harris Auto Tire Company, Savannah, Ga., has been incorporated with a capital stock of \$40,000 by S. N. Harris and others. It will manufacture automobile tires.

The Ellenton Fertilizer Company, Ellenton, Ga., has been incorporated with a capital stock of \$15,000 by H. M. Cassel and others. It will establish a fertilizer mixing plant.

The Brown-Belcher Lumber Company, Galliver, Fla., has been incorporated with a capital stock of \$10,000 by W. T. Sledd and others. It will operate a planing mill.

The Cowart Lumber Company, Tallahassee, Fla., is to make improvements in its lumber mill.

## Texas

AUSTIN, TEXAS, February 28, 1914.

The condition of the machinery and tool trade has shown little change during the past week. Cold weather has delayed building operations, and in the southern portions of the State damaged early crops.

The County Commissioners of Dallas County, Dallas, Texas, will receive bids until March 11 for a high- and low-pressure power plant with full equipment.

Alexander Boynton, owner of the Winter Gardens ranch, Crystal City, has closed a contract with Kilgore & Stott, Uvalde, Texas, for the construction of a dam across the Nueces River and an irrigation system to cost about \$200,000. A large amount of irrigation machinery will be installed.

The Stopple Mfg. Company, Dallas, has been organized with a capital stock of \$50,000. It will erect a factory for the manufacture of agricultural implements. The incorporators are W. H. Stopple, O. C. Stokely and Sidney B. Butler.

The Freeport Sulphur Company will erect a central electric power plant at its mines at Bryan Heights. A 200-kw. Westinghouse steam turbine, direct-connected generator set will be installed. It is expending \$125,000 on various equipment for its sulphur mines at Bryan Heights and loading machinery at Freeport. Practically all of the machinery will be electrically driven, including pumps, both for water and oil.

C. C. Baker, Sherman, head of the C. C. Baker Construction Company, announces that it will erect two brick manufacturing plants, one in Sherman and the other at Terrell, Texas. Fifty-two styles of finishing brick will be manufactured.

The Strawn Coal Company, Fort Worth, has been organized with a capital stock of \$500,000, and will engage in the mining of coal in Palo Pinto and other counties. The incorporators are W. Burton, and others.

The city of Tucson, Ariz., will expend \$165,000 on improvements and enlargements of the water works plant and system.

The Foss Ore Reduction Company, San Francisco, will erect a 500-ton plant at Mayer, Ariz. It is stated that the Pocohontas Copper Queen Company will also erect a reduction plant on its property four miles south of Mayer.

A reduction plant and mine and mill machinery will be installed at the Cerro Colorado mine, near Chinapa, Sonora, Mexico, at a cost of about \$100,000. Robert Dunne, care of the Carnegie Steel Company; J. J. Holman, Pittsburgh, and associates, are the owners.

The Alamogordo Water Works Company, Alamogordo, N. M., is preparing to erect a new power plant which will supply current to operate all the irrigation pumping plants of the Alamogordo Valley. A Diesel-type oil engine will be installed.

## The Pacific Northwest

SEATTLE, WASH., February 24, 1914.

The passage of the Alaska Railway bill has given new encouragement to business circles, and Seattle expects to benefit very largely by this enactment. Business conditions are improving. The logging camps and saw mills are in full swing and the shingle mills have reopened. The demand for machine tools is mostly for single tools, but orders are increasing in number. In miscellaneous lines mill and logging machinery continues to take the lead. Other industries are contributing a larger share than last month. Continued activity in the export trade is indicated by the cargo of the Mexico Maru, which left Tacoma, Wash., recently with shipments of electrical machinery valued at \$200,000 for Oriental ports and implements for Vladivostok amounting to \$120,000. One of the most important announcements ever made in Seattle is the statement given out by officials of the Pacific Coast Steamship Company that practically all of the repairing of the Seattle-San Francisco and Seattle-Alaska fleets will be done in Seattle. Between \$4,000,000 and \$4,500,000 will be expended in Seattle annually for wages and supplies.

The Parker Motor Car Company and Ajax Motor Company, Seattle, Wash., have completed plans for the erection of a joint factory at Ballard, a suburb of Seattle. The first unit of the factory will cost \$30,000. A new car, to be known as Ajax Six, will be made.

The Consolidated Milling Company, Twin Falls, Idaho, will begin the construction early in May of a large elevator in Amsterdam, Idaho. The structure will be of steel.

The Star Brass Works, Seattle, Wash., has been incorporated with a capital stock of \$6,000 by M. O. Stone, M. W. and E. Ryan.

The city of Portland has awarded to the Seattle Construction & Drydock Company, Seattle, a contract for building two 30-in. pumps for the dredge Chinook, at a cost of \$8100. The Albina Engine & Machine Works, Portland, on a bid of \$47,726, was low bidder for the installation of pumps and engines, and other improvements to the vessel's equipment. The United Iron Works, San Francisco, on a bid of \$80,337, was next lowest bidder.

The Colfax Iron Works, Colfax, Wash., has recently been organized with a capital stock of \$22,000. H. W. Chase, B. Cartlich, and others, are the incorporators. It will take over the Carley Brothers Company factory, and manufacture roller feed mills, etc. The capacity of the plant will be greatly increased and new machinery added.

The Everett Packing Company, Everett, Wash., will increase the equipment of its cannery. Much new machinery will be installed.

The power plant at Kalama, Wash., owned by the Oregon-Washington Railroad & Navigation Company, which was recently destroyed by fire, will be rebuilt by the owners at a cost of \$250,000.

The Vitriified Cement Machine Company, headed by C. Westergard, has established a shop at Thirty-second street and Paine avenue, Everett, Wash., for the manufacture of cement pipe machines.

The Idaho Power & Concentrating Company, Spokane, Wash., recently incorporated, will start work shortly on its first hydroelectric unit of 800 hp. Two units to be added later will bring the capacity to 2200 hp.

The Seattle Chain Works, Seattle, Wash., has been incorporated with a capital stock of \$5000 by A. H. Hoffman and H. E. Wooley.

W. J. Brett, Jr., purchasing agent, Hoge Building, Seattle, recently announced that he was in the market for 10,000 ft. of hydraulic pipe, a portable sawmill, a Pelton water wheel, etc., for Cook's Inlet, Alaska; also for a 15-ton locomotive crane and machinery for gravel bunkers on Puget Sound.

The Sumner Iron Works, Tacoma, Wash., has taken a contract for 10 machines for a shingle mill for the Southwest Mfg. Company, Raymond, Wash.

The C. B. Lumber & Shingle Company, Everett, Wash., plans the immediate erection at Everett of a

shingle mill of 350,000 shingles a day capacity. Olaf Carlson is president.

The stockholders of the Elmira Lumber Company, Eugene, Ore., have authorized extensive improvements to its plants at Elmira and Eugene, Ore. The plans include the installation of modern sawmill machinery. S. A. Buck is president of the company, and will personally supervise the work.

The city of Umatilla, Ore., has voted \$20,000 of bonds for the construction of a gravity water system. Louis C. Kelsey, Selling Building, Portland, is the engineer.

The C. A. Smith Lumber Company, Coos Bay, Ore., is adding two 600-hp. water-tube boilers to its mill, and is completing a 150-ft. concrete stack.

A. Hironymous has let a contract for the construction of a foundry and machine shop building at Milton, Ore.

The Laurel Milling Company, Laurel, Mont., has been incorporated to do a milling business. The mill of J. B. Grose, Butterfield, Minn., will be moved to Laurel, extensive improvements made and modern machinery added. M. W. Cramer, Martin Thusen, and others, are the incorporators.

## Western Canada

WINNIPEG, MAN., February 28, 1914.

The Western Canada Milling Company, Winnipeg, Man., will enlarge its plant at Calgary, Alta., at an estimated cost of \$100,000.

The Canadian Bell Watch Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$5,000 by H. Pyper, and others, to manufacture watches.

The Great West Implement Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$20,000 by H. W. Whitlaw and others.

The Security Rubber & Supply Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$30,000 by R. H. Richardson, and others, to manufacture auto and cycle accessories, etc.

The Calgary Mill Company, Calgary, Alta., will shortly start the construction of a mill at an estimated cost of \$1,500,000.

The Restmore Mfg. Company, Vancouver, B. C., will construct a brick factory at an estimated cost of \$147,000.

George A. Long, representative of the Weyerhaeuser interests in the Northwest, announced that the company will build a large fir mill at Everitt, B. C., this year.

Kenneth L. Burnet, W. D. Burdis, and J. D. Magee, Vancouver, B. C., represent an English syndicate, which will invest \$100,000 in the laying of foundations and preliminary work on a shipbuilding plant to be built near Sea Island. Plans are practically completed.

Fire completely destroyed the stock and factory of the Westminster Woodworking Company, Lulu Island, B. C. Damage was done to the extent of \$75,000.

D. F. Stewart, North Battleford, Sask., will establish a creamery to cost \$10,000.

L. Carey Wright, Medicine Hat Radiator Company, Medicine Hat, Alta., announces that work is progressing rapidly on the site of the new plant, and that as soon as weather conditions permit building operations will be started and pushed to an early completion. It is estimated the factory will cost about \$100,000. Mr. Wright will be in charge of the construction of the factory and the installation of the machinery.

The International Supply Company, Ltd., Medicine Hat, Alta., has been authorized by the stockholders to increase the capacity of its plant to enable it to supply the entire trade of western Canada in gas and oil-well supplies, etc. Extensions will be made as the business demands. Frank O. Sissons is president.

The Lake of the Woods Milling Company, Calgary, Alta., will build its factory at a cost of about \$200,000.

The municipality of Athabaska Landing, Alta., has voted bonds for \$85,000 for the extension of its water-works system. Clyde L. Huff is the engineer.

The Great West Implement Company, Ltd., Winnipeg, Man., has been incorporated, with a capital stock

of \$20,000, by H. W. Whitlaw, Marcus Hyman, and others.

The Western Tire & Rubber Mfg. Company will erect a plant at Regina, Sask., 60 x 300 ft., brick and reinforced concrete. The building and machinery will cost \$175,000.

The Mechanicsville Knitting Company, Mechanicsville, N. Y., has increased its capital stock from \$50,000 to \$100,000 to provide for additional manufacturing facilities.

## Eastern Canada

TORONTO, ONT., February 28, 1914.

The factory of the Dominion Meter Works, South London, Ont., was destroyed by fire at a loss of \$10,000.

The Stratford Mfg. Company, Stratford, Ont., will erect a factory, 60 x 160 ft., three stories, for the manufacture of lawn swings, ladders and porch furniture.

Charles Diebel, Hanover, Ont., will erect a factory, 50 x 150 ft., three stories, for the manufacture of furniture frames, etc., at Stratford, Ont.

A 100-ft. addition, to cost \$30,000, is to be built to the Horton street water and power station, London, Ont. The new equipment will be transferred to the addition, leaving the old building for a workshop.

The R. G. Long Company, Ltd., Toronto, glove manufacturer, has been burned out, with a loss of \$100,000. Much valuable machinery was destroyed, which will be replaced.

Fire completely destroyed the Petrolea Motor Company's factory at Petrolea, Ont. The loss was heavy.

The Business Aids, Ltd., Toronto, has been incorporated with a capital stock of \$40,000, by John G. Scott and others, to manufacture duplicating and addressing machines, office furniture, etc.

The Wallaceburg Brass & Iron Mfg. Company, Ltd., Wallaceburg, Ont., has increased its capital stock from \$40,000 to \$250,000.

The Canadian Traylor Engineering & Mfg. Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000, by Thomas J. Mullen, Harry Grant, Alfred Corbin, and others, to manufacture machines and machinery.

J. A. Major, Ltd., Montreal, has been incorporated with a capital stock of \$50,000, by Antoine Marchand, Joseph A. Guitard, and others, to build bridges, etc.

The William Bradley & Sons, Canadian, Ltd., Toronto, has been incorporated with a capital stock of \$10,000, by William A. J. Case, Harris E. Wallace, and others, to quarry and manufacture marble, granite, etc.

The Cedars Construction Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000, by Edward S. McDougall, Herbert W. Jackson, and others, to generate hydraulic power and electric current, etc.

The McGeough Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of \$150,000, by James E. Day, and others, to manufacture bedding, spring mattresses, chairs, etc.

The United Farmers Co-Operative Company, Ltd., Peterborough, Ont., has been incorporated with a capital stock of \$10,000, by William C. Good, and others, to manufacture and deal in machinery, implements, etc.

Rothchild & Co., Ltd., Sudbury, Ont., has been incorporated with a capital stock of \$300,000 by Daniel Rothchild, and others, to manufacture liquor cases, bottles, baskets, etc.

The Central Ice & Cold Storage Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of \$500,000, by Sutherland Cuddy, and others, to manufacture artificial ice, etc.

The Tanner Drug Company, Ltd., Lakefield, Ont., has been incorporated with a capital stock of \$40,000, by Edward A. Tanner, and others, to manufacture surgical, dental and sanitary supplies, etc.

The Mar Novelty Company, Ltd., Fort Erie, Ont., has been incorporated with a capital stock of \$10,000, by Clifford D. DeMar, and others, to manufacture novelties.

Sherer & Gillett, Chicago, Ill., manufacturers of clean food counters, will erect a factory at Guelph, Ont. W. A. Russell will be general manager for Canada.



## Government Purchases

WASHINGTON, D. C., March 2, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until March 17, schedule 6449, for hydraulic apparatus for Annapolis; schedule 6455, for 11 acetylene cylinders for Brooklyn; schedule 6455, for 35 steamless steel cylinders for Brooklyn; schedule 6449, for one precision bench lathe for Annapolis; schedule 6458, for one pneumatic 12-in. reach compression pump for Brooklyn; schedule 6477, for one motor generator for Camden; until March 24, for one water tube oil-burning testing boiler for Philadelphia; until March 31, for 12 turbine-driven forced-draft blowers for Brooklyn.

The U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., will receive sealed proposals until March 3 for furnishing vertical centrifugal pumps and steel framework for the Salt River project, Phoenix, Ariz. The Isthmian Canal Commission will open March 20, under circular 832, class 3, for furnishing 5000 ft. plow steel cable,  $\frac{3}{4}$  in.; 150,000 ft.  $\frac{3}{4}$  in., 8 strands; 10,000 ft.  $\frac{3}{4}$  in., and 12,000 ft.  $\frac{1}{2}$  in., 6 strands; also 3000 ft. straight link chain.

Bids were received by the general purchasing officer of the Isthmian Canal Commission, Washington, on February 21, for material and supplies, under circular 826, as follows:

Class One, four complete sand-blast equipments—Bid 2, \$616, 20 days; 8, \$1400, 60 days; 9, \$1320, 60 days, and \$1540, 30 days; 11, \$1420, 35 days; 28, \$1340, 30 days; 30, \$1419.60, 30 days; 41, A, \$1328; B, \$1000; C, for 1 machine only, fitted with 4 nozzles, \$950, 45 days; 45, \$1262.60, 30 days; 67, \$660, 45 days; 71, \$1140, 25 days.  
Class Three, 29,000 ft. plow-steel extra-flexible cable and 3000 ft. plow-steel hoisting cable—Bid 5, \$2591, 75 days; 35, \$2244, 40 days; 39, \$2506.80, 45 days; 61, \$1843.30, 30 days; 66, \$2259, 21 days; 74, \$1458, 30 days; 78, \$2515.50, 40 days.

The names of bidders and the number under which they are designated in the above list are as follows:

2. American Diamond Blast Company
5. F. A. Branda & Company.
8. Carter Metals Cleaning Company.
9. Curtis & Co. Mfg. Company.
11. The De Laverne Machine Company.
28. The Macleod Company.
30. Manhattan Supply Company.
35. George C. Moon Company.
39. Naylor & Company.
41. New York Cement Gun Company.
45. Pangborn Corporation.
61. U. S. Steel Products Company
66. Waterbury Company.
67. W. E. Williams.
71. J. M. Betton.
74. George S. Fowler.
78. J. B. Kendall Company.

## Trade Publications

**Iron and Steel Products.**—John C. Brill, 207 Queen & Crescent Building, New Orleans, La. Pamphlet. Treats of the different iron and steel products which are handled. The list gives the names of the various companies with the several lines made by each. The lines handled include billets, slabs, plates and sheets, structural material, bolts, nuts, washers, chains, tools, etc.

**Shovels.**—American Shovel & Stamping Company, Lorain, Ohio. Folder. Lists a number of different kinds of shovels and scoops and briefly describes them. Mention is also made of the line of pressed steel specialties and sheet steel stampings and forgings which can be supplied for a number of different classes of manufacturers.

**Iron and Steel.**—Charles G. Stevens Company, Monroe and Jefferson streets, Chicago, Ill. Card. Calls attention to the various lines of iron and steel products carried by this company, which include various shapes of rods, steel of all kinds and wire of various descriptions. On the reverse side of the card is given a table of standard wire gauges with the weight per 100 ft. and the decimal equivalents of fractional parts of an inch.

**Gongs.**—G. C. Reiter, Canton, Ohio. Several leaflets. Contain numerous illustrations with brief descriptions of different types of gongs for use as signals of all kinds. Included in these are gongs designed to be operated by the revolution of a wheel and others intended for mounting on a wall or column.

**Index Centers.**—Fred C. Dickow, 33 South Desplaines street, Chicago, Ill. Leaflet. Concerned with a set of 10-in. universal index centers, which divides all numbers to 50 and all even numbers to 100. The spindles can be clamped during the cutting operation and the swivel block can be set at any angle from 10 deg. below horizontal to 10 deg. beyond

the perpendicular and fastened in position. A view of the centers and a brief description of their construction is given.

**Rail Brake.**—Miller Supply Company, Huntington, W. Va. Pamphlet. Concerned with a device for dropping railroad cars under coal chutes over railroad or mine scales and for other similar uses. Aside from eliminating the possibility of runaways through defective brakes, it is also claimed for the device that with its use one man can handle more cars than three in the ordinary way as the car is under control of the operator and can be moved any desired distance. In use the brake is fastened to the rail and the car is moved by working a lever back and forth. Views of the device in use are given, together with reproductions of a number of testimonial letters.

**Iron and Wire Work.**—Lau & Hogan, 452 West Federal street, Youngstown, Ohio. Circular. Describes the various kinds of structural and ornamental iron and wire work which this firm is prepared to furnish. These include structural and plate work, rivets, nuts, wire, fire escapes and guards of all kinds, fire doors and pipe railings.

**Oil Can.**—E. L. Arnott Company, Greenfield, Ohio. Folder. Illustrates a special type of galvanized can for oil or gasoline. The special features claimed for the can are that it can be entirely emptied, there is no evaporation, and that any liquid in the spout is drawn back into the body of the can.

**Metal Working Machinery.**—Excelsior Tool & Machine Company, East St. Louis, Ill. Circular. Consists almost entirely of illustrations showing a great variety of metal working machinery, including shearing, flanging, grinding, punching and polishing machines. There are no descriptions given, there being simply illustrations of the machines, with a brief caption. Among the machines shown are a double-spindle polishing and buffing machine, and one of a line of belt-driven grinding and polishing machines, which were illustrated in *The Iron Age*, October 10, 1912, and February 27, 1913, respectively. Views of a number of samples of work turned out are also included.

**Steel Tanks.**—Maloney Tank Mfg. Company, Tulsa, Okla. Circular. Refers to the use of a knockdown bolted steel tank which can be taken apart and moved to another location and re-erected. The particular feature about these tanks is leaks, evaporation and tank houses are all eliminated. Views of tanks having capacities of 25, 50 and 100 bbl. are given, and larger sizes can be built to order.

**Outlet Traps.**—Bestow-Baldwin Bridge Company, Jeffersonville, Ill. Leaflet. Points out the advantages of using this trap on a drain to prevent trash from floating back through the tile drain and clogging it. A view of the trap, which is made of corrugated metal, protected by galvanizing, is given, together with a table of the sizes in which it can be supplied.

**Taps.**—Butterfield & Co., Rock Island, Que., Canada. Two leaflets. Call attention to a line of machinists' hand and taper taps. Views of three types of hand taps are given on one of the leaflets.

**Bar Iron.**—Southern Iron & Commission Company, Birmingham, Ala. Circular. Lists the various sizes of round, square and flat bars and round edge tire iron that is rolled by this company.

**Machinery Building.**—Taft-Pierce Mfg. Company, Woonsocket, R. I. Pamphlet. Calls attention to the service that this company is prepared to render in the designing of special tools and machinery for the economical production of interchangeable machine parts and the manufacturing of light machinery under contract. Views of some of the machines manufactured by this company, which include gasoline engines, typewriters, type casting machines and various metal working machines are given, together with portions of the plant, the last being supplemented by brief descriptions.

**Can Filling Machinery.**—Elgin Mfg. Company, Elgin, Ill. Pamphlet. Gives general description and specifications for a line of can filling machinery for powdered and heavy liquid substances. In addition to engravings of the machines themselves, views are given showing the various parts entering into their construction. The machines illustrated include both automatic and hand operated types.

**Factory Furniture.**—Henry Rowe Mfg. Company, Newaygo, Mich. Circular. Shows a line of factory furniture, including drawing tables, cabinet makers' and machinists' benches, a factory truck and a horizontal filing cabinet. Brief descriptions of the several pieces are included.

**Electric Welding Machines.**—Winfield Electric Welding Machine Company, Warren, Ohio. Pamphlet. Pertains to a line of spot and butt welding machines. A description of the spot welding process, together with a discussion of the kinds and thicknesses of materials that can be handled in this way is given, followed by brief illustrated descriptions of several types of machines. A short outline of the butt welding process is next presented with condensed descriptions and illustrations of several types of machines. Tables giving the power and time required for making spot and butt welds in various thicknesses of material are included, together with a table of the standard weights of iron and steel plates and sheets.



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